

# THE BIOLOGICAL BULLETIN

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## THE MARINE BIOLOGICAL LABORATORY

EIGHTY-SECOND REPORT, FOR THE YEAR 1979—NINETY-SECOND YEAR

I.	TRUSTEES AND STANDING COMMITTEES.....	1
II.	MEMBERS OF THE CORPORATION.....	5
III.	CERTIFICATE OF ORGANIZATION.....	35
IV.	ARTICLES OF AMENDMENT.....	36
V.	BYLAWS.....	37
VI.	REPORT OF THE DIRECTOR.....	42
VII.	REPORT OF THE TREASURER.....	49
VIII.	REPORT OF THE LIBRARIAN.....	62
IX.	EDUCATIONAL PROGRAMS.....	62
	1. SUMMER.....	62
	2. JANUARY.....	70
	3. SHORT COURSES.....	75
X.	RESEARCH AND TRAINING PROGRAMS.....	80
	1. SUMMER.....	80
	2. YEAR-ROUND.....	89
XI.	HONORS.....	94
	1. FRIDAY EVENING LECTURES.....	94
	2. FELLOWSHIPS AND SCHOLARSHIPS.....	95
XII.	INSTITUTIONS REPRESENTED.....	95
XIII.	LABORATORY SUPPORT STAFF.....	99

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### III. CERTIFICATE OF ORGANIZATION

(On File in the Office of the Secretary of the Commonwealth)

No. 3170

We, Alpheus Hyatt, President, William Stanford Stevens, Treasurer, and William T. Sedgwick, Edward G. Gardiner, Susan Mims and Charles Sedgwick Minot being a majority of the Trustees of the Marine Biological Laboratory in compliance with the

requirements of the fourth section of chapter one hundred and fifteen of the Public Statutes do hereby certify that the following is a true copy of the agreement of association to constitute said Corporation, with the names of the subscribers thereto:-

We, whose names are hereto subscribed, do, by this agreement, associate ourselves with the intention to constitute a Corporation according to the provisions of the one hundred and fifteenth chapter of the Public Statutes of the Commonwealth of Massachusetts, and the Acts in amendment thereof and in addition thereto.

The name by which the Corporation shall be known is THE MARINE BIOLOGICAL LABORATORY.

The purpose for which the Corporation is constituted is to establish and maintain a laboratory or station for scientific study and investigations, and a school for instruction in biology and natural history.

The place within which the Corporation is established or located is the city of Boston within said Commonwealth.

The amount of its capital stock is none.

*In Witness Whereof*, we have hereunto set our hands, this twenty seventh day of February in the year eighteen hundred and eighty-eight, Alpheus Hyatt, Samuel Mills, William T. Sedgwick, Edward G. Gardiner, Charles Sedgwick Minot, William G. Farlow, William Stanford Stevens, Anna D. Phillips, Susan Mims, B. H. Van Vleck.

That the first meeting of the subscribers to said agreement was held on the thirteenth day of March in the year eighteen hundred and eighty-eight.

*In Witness Whereof*, we have hereunto signed our names, this thirteenth day of March in the year eighteen hundred and eighty-eight, Alpheus Hyatt, President, William Stanford Stevens, Treasurer, Edward G. Gardiner, William T. Sedgwick, Susan Mims, Charles Sedgwick Minot.

(Approved on March 20, 1888 as follows:

*I hereby certify* that it appears upon an examination of the within written certificate and the records of the corporation duly submitted to my inspection, that the requirements of sections one, two and three of chapter one hundred and fifteen, and sections eighteen, twenty and twenty-one of chapter one hundred and six, of the Public Statutes, have been complied with and I hereby approve said certificate this twentieth day of March A.D. eighteen hundred and eighty-eight.

CHARLES ENDICOTT  
*Commissioner of Corporations*)

#### IV. ARTICLES OF AMENDMENT

(On File in the Office of the Secretary of the Commonwealth)

We, James D. Ebert, President, and David Shepro, Clerk of the Marine Biological Laboratory, located at Woods Hole, Massachusetts 02543, do hereby certify that the following amendment to the Articles of Organization of the Corporation was duly adopted at a meeting held on August 15, 1975, as adjourned to August 29, 1975, by

vote of 444 members, being at least two-thirds of its members legally qualified to vote in the meetings of the corporation:

VOTED: That the Certificate of Organization of this corporation be and it hereby is amended by the addition of the following provisions:

“No Officer, Trustee or Corporate Member of the corporation shall be personally liable for the payment or satisfaction of any obligation or liabilities incurred as a result of, or otherwise in connection with, any commitments, agreements, activities or affairs of the corporation.

“Except as otherwise specifically provided by the Bylaws of the corporation, meetings of the Corporate Members of the corporation may be held anywhere in the United States.

“The Trustees of the corporation may make, amend or repeal the Bylaws of the corporation in whole or in part, except with respect to any provisions thereof which shall by law, this Certificate or the Bylaws of the corporation, require action by the Corporate Members.”

The foregoing amendment will become effective when these articles of amendment are filed in accordance with Chapter 180, Section 7 of the General Laws unless these articles specify, in accordance with the vote adopting the amendment, a later effective date not more than thirty days after such filing, in which event the amendment will become effective on such later date.

*In Witness whereof and Under the Penalties of Perjury*, we have hereto signed our names this 2nd day of September, in the year 1975, James D. Ebert, President; David Shepro, Clerk.

(Approved on October 24, 1975, as follows:

I hereby approve the within articles of amendment and, the filing fee in the amount of \$10 having been paid, said articles are deemed to have been filed with me this 24th day of October, 1975.

PAUL GUZZI  
*Secretary of the Commonwealth*)

## V. BYLAWS OF THE CORPORATION OF THE MARINE BIOLOGICAL LABORATORY

(Revised August 11, 1978)

I. (A) The name of the Corporation shall be The Marine Biological Laboratory. The Corporation's purpose shall be to establish and maintain a laboratory or station for scientific study and investigation, and a school for instruction in biology and natural history.

(B) Marine Biological Laboratory admits students without regard to race, color, sex, national and ethnic origin to all the rights, privileges, programs and activities generally accorded or made available to students in its courses. It does not discriminate on the basis of race, color, sex, national and ethnic origin in employment, administration of its educational policies, admissions policies, scholarship and other programs.

II. (A) The members of the Corporation ("Members") shall consist of persons elected by the Board of Trustees, upon such terms and conditions and in accordance

with such procedures, not inconsistent with law or these Bylaws, as may be determined by said Board of Trustees. Except as provided below, any Member may vote at any meeting, either in person or by proxy executed no more than six months prior to the date of such meeting. Members shall serve until their death or resignation unless earlier removed, with or without cause, by the affirmative vote of two-thirds of the Trustees then in office. Any Member who has attained the age of seventy years or has retired from his home institution shall automatically be designated a Life Member provided he signifies his wish to retain his membership. Life Members shall not have the right to vote and shall not be assessed for dues.

(B) The Associates of the Marine Biological Laboratory shall be an unincorporated group of persons (including associations and corporations) interested in the Laboratory and shall be organized and operated under the general supervision and authority of the Trustees.

III. The officers of the Corporation shall consist of a Chairman of the Board of Trustees, President, Director, Treasurer and Clerk, elected or appointed by the Trustees as set forth in Article IX.

IV. The Annual Meeting of the Members shall be held on the Friday following the Second Tuesday in August in each year at the Laboratory in Woods Hole, Massachusetts, at 9:30 a.m. Subject to the provisions of Article VIII(2), at such meeting the Members shall choose by ballot six Trustees to serve four years, and shall transact such other business as may properly come before the meeting. Special meetings of the Members may be called by the Chairman or Trustees to be held at such time and place as may be designated.

V. Twenty five Members shall constitute a quorum at any meeting. Except as otherwise required by law or these Bylaws, the affirmative vote of a majority of the Members voting in person or by proxy at a meeting attended by a quorum (present in person or by proxy) shall constitute action on behalf of the Members.

VI. (A) Inasmuch as the time and place of the Annual Meeting of Members are fixed by these Bylaws, no notice of the Annual Meeting need be given. Notice of any special meeting of Members, however, shall be given by the Clerk by mailing notice of the time and place and purpose of such meeting, at least 15 days before such meeting, to each Member at his or her address as shown on the records of the Corporation.

(B) Any meeting of the Members may be adjourned to any other time and place by the vote of a majority of those Members present or represented at the meeting, whether or not such Members constitute a quorum. It shall not be necessary to notify any Member of any adjournment.

VII. The Annual Meeting of the Trustees shall be held promptly after the Annual Meeting of the Corporation at the Laboratory in Woods Hole, Massachusetts. Special meetings of the Trustees shall be called by the Chairman, the President, or by any seven Trustees, to be held at such time and place as may be designated. Notice of Trustees' meetings may be given orally, by telephone, telegraph or in writing; and notice given in time to enable the Trustees to attend, or in any case notice sent by mail or telegraph to a Trustee's usual or last known place of residence, at least one week before the meeting shall be sufficient. Notice of a meeting need not be given to any Trustee if a written waiver of notice, executed by him before or after the meeting is filed with the records of the meeting, or if he shall attend the meeting without protesting prior thereto or at its commencement the lack of notice to him.

VIII. (A) There shall be four groups of Trustees:

(1) Trustees (the "Corporate Trustees") elected by the Members according to such procedures, not inconsistent with these Bylaws, as the Trustees shall have determined. Except as provided below, such Trustees shall be divided into four classes of six, one class to be elected each year to serve for a term of four years. Such classes shall be designated by the year of expiration of their respective terms.

(2) Trustees ("Board Trustees") elected by the Trustees then in office according to such procedures, not inconsistent with these Bylaws, as the Trustees shall have determined. Except as provided below, such Board Trustees shall be divided into four classes of three, one class to be elected each year to serve for a term of four years. Such classes shall be designated by the year of expiration of their respective terms. It is contemplated that, unless otherwise determined by the Trustees for good reason, Board Trustees shall be individuals who have not been considered for election as Corporate Trustees.

(3) Trustees ex officio, who shall be the Chairman, the President, the Director, the Treasurer, and the Clerk.

(4) Trustees emeriti who shall include any Member who has attained the age of seventy years (or the age of sixty five and has retired from his home institution) and who has served a full elected term as a regular Trustee, provided he signifies his wish to serve the Laboratory in that capacity. Any Trustee who qualifies for emeritus status shall continue to serve as a regular Trustee until the next Annual Meeting whereupon his office as regular Trustee shall become vacant and be filled by election by the Members or by the Board, as the case may be. The Trustees ex officio and emeriti shall have all the rights of the Trustees, except that Trustees emeriti shall not have the right to vote.

(B) The aggregate number of Corporate Trustees and Board Trustees elected in any year (excluding Trustees elected to fill vacancies which do not result from expiration of a term) shall not exceed nine. The number of Board Trustees so elected shall not exceed three and unless otherwise determined by vote of the Trustees, the number of Corporate Trustees so elected shall not exceed six.

(C) The Trustees and Officers shall hold their respective offices until their successors are chosen in their stead.

(D) Any Trustee may be removed from office at any time with or without cause, by vote of a majority of the Members entitled to vote in the election of Trustees; or for cause, by vote of two-thirds of the Trustees then in office. A Trustee may be removed for cause only if notice of such action shall have been given to all of the Trustees or Members entitled to vote, as the case may be, prior to the meeting at which such action is to be taken and if the Trustee so to be removed shall have been given reasonable notice and opportunity to be heard before the body proposing to remove him.

(E) Any vacancy in the number of Corporate Trustees, however, arising may be filled by the Trustees then in office unless and until filled by the Members at the next Annual Meeting. Any vacancy in the number of Board Trustees may be filled by the Trustees.

(F) A Corporate Trustee or a Board Trustee who has served an initial term of at least 2 years duration shall be eligible for re-election to a second term, but shall be ineligible for re-election to any subsequent term until two years have elapsed after he last served as a Trustee.

IX. (A) The Trustees shall have the control and management of the affairs of the Corporation. They shall elect a Chairman of the Board of Trustees who shall be elected annually and shall serve until his successor is selected and qualified and who shall also preside at meetings of the Corporation. They shall elect a President of the Corporation who shall also be the Vice Chairman of the Board of Trustees and Vice Chairman of meetings of the Corporation, and who shall be elected annually and shall serve until his successor is selected and qualified. They shall annually elect a Treasurer who shall serve until his successor is selected and qualified. They shall elect a Clerk (a resident

of Massachusetts) who shall serve for a term of 4 years. Eligibility for re-election shall be in accordance with the content of Article VIII (F) as applied to Corporate or Board Trustees. They shall elect Board Trustees as described in Article VIII (B). They shall appoint a Director of the Laboratory for a term not to exceed five years, provided the term shall not exceed one year if the candidate has attained the age of 65 years prior to the date of the appointment. They may choose such other officers and agents as they may think best. They may fix the compensation and define the duties of all the officers and agents of the Corporation and may remove them at any time. They may fill vacancies occurring in any of the offices. The Board of Trustees shall have the power to choose an Executive Committee from their own number as provided in Article X, and to delegate to such Committee such of their own powers as they may deem expedient in addition to those powers conferred by Article X. They shall from time to time elect Members to the Corporation upon such terms and conditions as they shall have determined, not inconsistent with law or these Bylaws.

(B) The Board of Trustees shall also have the power, by vote of a majority of the Trustees then in Office, to elect an Investment Committee and any other committee and, by like vote, to delegate thereto some or all of their powers except those which by law, the Articles of Organization or these Bylaws they are prohibited from delegating. The members of any such committee shall have such tenure and duties as the Trustees shall determine; provided that the Investment Committee, which shall oversee the management of the Corporation's endowment funds and marketable securities, shall include the Chairman of the Board of Trustees, the Treasurer of the Corporation, and the Chairman of the Corporation's Budget Committee, as *ex officio* members, together with such Trustees as may be required for not less than two-thirds of the Investment Committee to consist of Trustees. Except as otherwise provided by these Bylaws or determined by the Trustees, any such committee may make rules for the conduct of its business; but, unless otherwise provided by the Trustees or in such rules, its business shall be conducted as nearly as possible in the same manner as is provided by these Bylaws for the Trustees.

X. (A) The Executive Committee is hereby designated to consist of not more than ten members, including the *ex officio* Members (Chairman of the Board of Trustees, President, Director and Treasurer); and six additional Trustees, two of whom shall be elected by the Board of Trustees each year, to serve for a three-year term.

(B) The Chairman of the Board of Trustees shall act as Chairman of the Executive Committee, and the President as Vice Chairman. A majority of the members of the Executive Committee shall constitute a quorum and the affirmative vote of a majority of those voting at any meeting at which a quorum is present shall constitute action on behalf of the Executive Committee. The Executive Committee shall meet at such times and places and upon such notice and appoint such sub-committees as the Committee shall determine.

(C) The Executive Committee shall have and may exercise all the powers of the Board during the intervals between meetings of the Board of Trustees except those powers specifically withheld from time to time by vote of the Board or by law. The Executive Committee may also appoint such committees, including persons who are not Trustees, as it may from time to time approve to make recommendations with respect to matters to be acted upon by the Executive Committee or the Board of Trustees.

(D) The Executive Committee shall keep appropriate minutes of its meetings and its action shall be reported to the Board of Trustees.

(E) The elected Members of the Executive Committee shall constitute as a standing "Committee for the Nomination of Officers," responsible for making nominations, at each Annual Meeting of the Corporation, and of the Board of Trustees, for candidates to fill each office as the respective terms of office expire (Chairman of the Board, President, Director, Treasurer, and Clerk).

XI. A majority of the Trustees, the Executive Committee, or any other committee elected by the Trustees shall constitute a quorum; and a lesser number than a quorum



may adjourn any meeting from time to time without further notice. At any meeting of the Trustees, the Executive Committee, or any other committee elected by the Trustees, the vote of a majority of those present, or such different vote as may be specified by law, the Articles of Organization or these Bylaws, shall be sufficient to take any action.

XII. Any action required or permitted to be taken at any meeting of the Trustees, the Executive Committee or any other committee elected by the Trustees as referred to under Article IX may be taken without a meeting if all of the Trustees or members of such committee, as the case may be, consent to the action in writing and such written consents are filed with the records of meetings. The Trustees or members of the Executive Committee or any other committee appointed by the Trustees may also participate in meeting by means of conference telephone, or otherwise take action in such a manner as may from time to time be permitted by law.

XIII. The consent of every Trustee shall be necessary to dissolution of the Marine Biological Laboratory. In case of dissolution, the property shall be disposed of in such manner and upon such terms as shall be determined by the affirmative vote of two-thirds of the Board of Trustees then in office.

XIV. These Bylaws may be amended by the affirmative vote of the Members at any meeting, provided that notice of the substance of the proposed amendment is stated in the notice of such meeting. As authorized by the Articles of Organization, the Trustees, by a majority of their number then in office, may also make, amend, or repeal these Bylaws, in whole or in part, except with respect to (a) the provisions of these Bylaws governing (i) the removal of Trustees and (ii) the amendment of these Bylaws and (b) any provisions of these Bylaws which by law, the Articles of Organization or these Bylaws, requires action by the Members.

No later than the time of giving notice of the meeting of Members next following the making, amending or repealing by the Trustees of any Bylaw, notice thereof stating the substance of such change shall be given to all Corporation Members entitled to vote on amending the Bylaws.

Any Bylaw adopted by the Trustees may be amended or repealed by the Members entitled to vote on amending the Bylaws.

XV. The account of the Treasurer shall be audited annually by a certified public accountant.

XVI. The Corporation will indemnify every person who is or was a trustee, officer or employee of the Corporation or a person who provides services without compensation to an Employee Benefit Plan maintained by the Corporation, for any liability (including reasonable costs of defense and settlement) arising by reason of any act or omission affecting an Employee Benefit Plan maintained by the Corporation or affecting the participants or beneficiaries of such Plan, including without limitation any damages, civil penalty or excise tax imposed pursuant to the Employee Retirement Income Security Act of 1974; provided, (1) that the Act or omission shall have occurred in the course of the person's service as trustee or officer of the Corporation or within the scope of the employment of an employee of the Corporation or in connection with a service provided without compensation to an Employee Benefit Plan maintained by the Corporation, (2) that the Act or omission be in good faith as determined by the Corporation (whose determination made in good faith and not arbitrarily or capriciously shall be conclusive), and (3) that the Corporation's obligation hereunder shall be offset to the extent of any otherwise applicable insurance coverage, under a policy maintained by the Corporation or any other person, or other source of indemnification.

## VI. REPORT OF THE DIRECTOR

"...There is no difficulty in forming government. It is not even a matter of choice whether there shall be one or not. Like breathing, it is not permitted to depend on our volition. Necessity will force it on all communities in some one form or another. Very different is the case as to constitution. Instead of a matter of necessity, it is one of the most difficult tasks imposed on man to form a constitution worthy of the name, while to form a perfect one—one that would completely counteract the tendency of government to oppression and abuse and hold it strictly to the great ends for which it is ordained—has thus far exceeded human wisdom, and possibly ever will."

—John C. Calhoun (1782–1850)  
*A Disquisition on Government*

I have chosen this rubric, the product of an exceptional, though pessimistic mind among this nation's founding fathers, because I believe, as will emerge, that the most difficult task facing the Laboratory and those entrusted with its management is governance: its discussion, and, as may prove necessary, its modification.

Not long ago, survival itself was at issue. In those circumstances, the front line is always a battle-line. Economic survival, and the compromises thought by some to be necessary in aid of it, were the issues. The weapons of battle were budget-making, belt-tightening, a cold eye cast on proposals for spending; draconic measures to insure recovery, at least in part, of the costs of doing and teaching science. In that atmosphere, governance was, quite properly, seen as a merely peacetime concern, properly to be held in abeyance until the issue of battle became clear.

Remarkably, the issue *has*, in a short time, become clear. We have won the battle and are in the process of mopping up. The M.B.L. will survive, and it will continue into its second century as a beacon of biology. This is not to say that economic threat, to which so many sister institutions have succumbed, has vanished; rather, we have learned how to live with it, and there is no reason to believe that we shall need, in the foreseeable future, to spend principal merely to stay at work. Our children will be able to come to the M.B.L. to partake, as we did, of its unique opportunity: the opportunity for those with imagination, energy, and self-discipline, independent of background or institution of origin, to work in close contact with, and to become, leaders of biology, pure and applied.

The tests we face for the immediate future are indeed tests, rather than battles. We will be tested in the responsibility to participate broadly and unselfishly, within the Corporation and the M.B.L. family generally, in the raising of what are for this place large sums of money—*not* for survival, but in order to insure that the full promise of this institution is realized. And we shall need to be flexible and wise about procedures and governance during the half-decade of transition ahead, in a period when our aging campus is returned to a condition matched to the quality of its scientific product, and during a time in which we attempt to endow the campus and its science financially, in such a way that survival will thereafter be assured. The choice of what to investigate, and what to teach, will thus be *ours*, not that of transient sponsors, nor of agencies of government, however benevolent.

## PROGRAMS

1. *Summer Research.* In the summer of 1979 the M.B.L. was fully occupied. Every square foot of usable research space was rented. Upon the basis of reports made at the General Scientific Meetings, and of results I have myself heard about in other contexts, they were occupied with an unusual productivity. By virtue of an exceptional staff job of fitting people and programs into the available laboratories, and by a considerable effort of persuasion to secure agreements for sharing, it was

possible to accommodate all principal investigators who offered programs acceptable to our Research Space Committee, and to accommodate further the bulk of students and assistants for whom they sought places.

The summer of 1979 must therefore be counted as a very special one, even by the high standards of the M.B.L. In a time of increasingly restricted funding of individual research projects, and of research costs rising with awesome speed, there was sufficient recognition among productive investigators of the value of research at the M.B.L., and sufficient recognition of that value among their study section peers, to bring about full occupancy; to enlist some thousand people in the creation of the special scientific atmosphere that is a Woods Hole summer; and to limit disappointments and troubles to a gratifyingly small number.

The capstone of the research summer was the Friday Evening Lecture series, opened with an elegant presentation by Edward Wilson, and highlighted by a provocative discussion of biological "self" offered by the man who, better than any other, has chronicled the meaning of those lectures: Lewis Thomas. The session-closing General Scientific Meetings, revived by the efforts of Hans Laufer a year earlier, fulfilled the promise of such a summer, under the direction of Joel Rosenbaum and his able associates.

Rather than make the Quixotic attempt to choose, among the nine or ten signal accomplishments of that summer, one or two for presentation in this report, I substitute an anecdote: In the early spring of 1980, sitting on a panel charged with the judgment and ranking of research proposals in the fields of my own work—cellular and developmental biology—I came across no fewer than five citations of results obtained in Woods Hole during the preceding summer as critical to the proposal substance. All those proposals were approved.

If ever there was a case of success breeding headaches, this is one. The indications for the summer of 1980 are more, and perhaps troublesomely more, of the same. At the time of writing the available space is not only fully claimed, but in a few cases doubly claimed. We have reached the practical limit of civilized space-sharing, and we have had an ominously *small* number of cancellations, by the standard of earlier years.

Clearly, an exciting and densely-populated summer is ahead of us in 1980. The new Parasitism course will be given for the first time; we can expect a distinguished addition, thereby, to the scientific population of Woods Hole. Rather than diminishing, the popularity and significance of the squid and its giant axon seem to be increasing. John Valois and his colleagues, quietly competent as they are, will have their work cut out for them, and the fishermen will come close inshore to compete. The question is: Can we, the Corporation, the Trustees, and the Administration, deal well and in a principled way with a situation foreign to our recent history (but quite familiar to our predecessors here): the need to turn away qualified applicants? We shall see. This resolves into one of those issues of governance for which I chose the rubric of this report.

Once again, the Friday Evening Lectures bid fair to be the intellectual and even the social highlight of the coming season. The speakers scheduled for it are of a level of recognition and achievement that can be matched by few institutions. The only mitigation I can think of, in the face of such disquieting and sequential eminence, is that every one of these speakers will, at some time during his stay in Woods Hole, need to answer some searching scientific questions.

2. *Year-round research.* The size of our year-round research program, as measured by numbers of persons engaged or the number of dollars spent on it, has again increased somewhat in the interval since the last Director's Report was written. In fiscal terms, this increase is a little faster, but marginally so, than inflation. In human terms, it is a good deal faster. The indications are, however, that by the fall of 1980 a quasi-equilibrium will have been established: retirements and space-constrictions (to the Library Readership that is the Nirvana of all devout M.B.L. scientists) will match nicely the establishment of new year-round laboratories. The undertaking

given to the Trustees in February of 1979 is to be upheld, *i.e.*, that consolidation, improvement, and growth of the year-round science at M.B.L. will not infringe *significantly*, over any stretch of a few years, upon the Laboratory's capacity to host its traditional transient programs.

The M.B.L. Ecosystems Center maintains its strength and a determined independence of its views. They and we look forward, mainly with happy anticipation, but in a minor way with intimations of hard work ahead, to the construction of our new Environmental Sciences Center, toward whose cost of approximately \$1.2 million we received last year a grant of \$0.9 million from the Fleischmann Foundation. The new facility will be a boon to all Woods Hole environmentalists.

The Laboratory of Biophysics, an intramural program of the National Institutes of Health here "on location," continues to function in a productive way and in a broad range of subdisciplines in neuroscience. The first of a new series of contracts between the old H.E.W. (now Department of Health and Human Resources) and the M.B.L., for the operation of this program, has been executed, and there is every reason to believe that the next five years will be as productive as the last, and—one hopes—somewhat easier to manage.

Dr. MacNichol's Sensory Physiology program continues to produce significant and technically admirable work, and to be supported for it, despite certain internecine conflicts within the cognizant advisory bodies on the question of the relevance of research on invertebrates. A small but well-deserved expansion of their space and facilities will take place shortly.

Cell Biology, that quintessential M.B.L. subject, and so ably represented on the campus in prior years, has had an upward shift coincident with the arrival here of Shinya Inoué as a year round investigator, and has been aided further by the establishment of Sidney Tamm as a faculty member of the B.U.M.P. program. Although Dr. Tamm has devised a number of wickedly effective methods for badgering the Director on matters of overhead, it is already clear that his work on cellular motility will flourish in Woods Hole.

The only year-round program, in fact, that has not shown growth consistent with last year's expectations is Developmental Biology, and this is directly traceable to the style of the Director's life, since he is a developmentalist (in principle), and was supposed to devote some reasonable part of his time to program-building in that important subject. To be sure, the Director's *own* scientific work has continued, thanks to generous arrangements made by the University of Rochester, and to the quality of his Rochester colleagues and students. It is however clear that some changes will have to be made in the Director's list of responsibilities so that he can establish and help to manage a new and major year-round research program.

3. *Education.* The Laboratory's educational programs are in good health, due, in part, to their inherent excellence, and in part to the nonthreatening, but conscious control and overview processes that have been instituted during the two years past.

The five January courses enrolled a total of 108 students, compared with 114 in 1978. This is a nonsignificant variation. The only systematic change suggested by a study of the January semester as a whole is that the quality of applicants rose detectably in 1979. Alan Fein, who had earlier served with Fred Lang as co-Instructor-in-Chief of the Neurobiology Course, took full responsibility for it less than three weeks before the start, following Fred Lang's tragic death in an automobile accident. Ted MacNichol, among others, stepped into the gap with courage and selflessness. The 1979 course was a great success, exceeded, perhaps, only by the success of the 1980 version, which had the benefit of a dedicated supervision by Daniel Alkon, one of the leaders of the M.B.L. year-round neuroscience program.

Among the short courses, the design and supervision of which are ably handled by Morton Maser, there was a high *esprit*, the best testament to which is the body of letters received from participants. A number of new courses were mounted in 1979, including Comparative Light and Electron Microscopy in Clinical Diagnosis (Harry Carter in charge), and Mariculture—the Culture of Marine Invertebrates for

Research Purposes (Carl Berg in charge). In 1979, nine short courses enrolled some 125 students, which approximates 87% of the planned capacity.

The summer teaching session, populated in 1979 by 142 students (compared with 148 in 1978), was an exciting one. Tom Humphreys and Joan Ruderman ended their tours of duty as co-directors of the Embryology Course, which had, if possible, an even more stellar student body than the year before; and Rudolf Raff, of the University of Indiana, took the initial steps in assuming directorship of the course for the term to come.

Six important and productive years of Jerome Schiff's directorship of the Botany course ended with this year's offering, and with an announced hiatus of one year in the offering of a marine botany course, during which a national committee of advisors will make proposals for the design of its successor. Dr. Lawrence Bogorad, the eminent Harvard botanist, will chair the committee of review, and will be in residence during the summer of 1980. A core group of the 1979 botany faculty will direct a specialized research and training program, under the rules for independent investigatorship, in the summer of 1980.

The Microbial Ecology course, directed by Harlyn Halvorson and Holger Jannasch, will be offered in an expanded version in 1980, residing temporarily, for that session, in the Loeb quarters normally used by Botany.

A term of outstanding service to the M.B.L.'s educational venture ended in 1979 with completion of Edward Kravitz's tour as instructor-in-chief of Neurobiology. He has been succeeded by John Hildebrand and Tom Reese. The identity and scientific reputations of those two insure that Dr. Kravitz's achievement will have the desired continuity.

Ronald Hoy accepted (generously) responsibility for the Neural Systems and Behavior course following a tragic death in the Gelperin family, the result of which was that the course's energetic founder, Alan Gelperin of Princeton, was unable to continue. Ronald Hoy's tenure will, undoubtedly, substitute for the Princetonian a certain Cornellian flavor to the enterprise, but that—however one judges Cornell as against Princeton—has already had the good effect of sharpening the substantive focus of the course, and of attracting to its important activities, at the interface between cellular neurobiology and behavioral science, a helpful amount of financial support.

The Boston University Marine Program, under the directorship of Arthur Humes, solidified its important position as an element of the Woods Hole educational spectrum. The tenth anniversary of the program was celebrated this year at an occasion of a very positive character, held in November at our Swope Center. Two new faculty have joined the program: Drs. Sidney Tamm and Christopher Price. C. K. Govind, of the University of Toronto, was a visiting senior faculty member during the second half of the year. There are now 34 B.U.M.P. graduate students in residence, about two-thirds of them candidates for the Ph.D. degree, supervised by five regular faculty who have the assistance of a much larger number of colleagues.

The level of B.U.M.P. activity in gestating and delivering Ph.D.'s, (in such fields as ecology, ecological genetics, physiology, and neurobiology) remains high—three the past year, and the production of quality research papers and of fruitful scientific interchanges, as, for example, in seminars, is equalled, and certainly not exceeded, by a very few other educational programs in marine biology.

Planning began, in 1979, for broadening in two directions of the activities now centered about the unique late-spring course in Aquatic Veterinary Medicine ("Aquavet"), which is coordinated by Donald Abt, supported in many ways by the parent schools of veterinary medicine (Pennsylvania and Cornell), and taught by a faculty group of multi-institutional origin. One direction will be research-centered, providing systematic opportunity for veterinarians in training and for other young biologists to carry out relevant research in M.B.L. laboratories. The other, an initiative that will take longer to be realized, but that will provide an important element of planning for the ultimate marine resources center and facilities, is the provision

of diagnostic and other clinical services, under direction of qualified veterinarians, for the collection, maintenance, and use of marine animals.

4. *Scientific Meetings.* The skill with which Homer Smith and his staff manage the jigsaw puzzle of accommodations and facilities for scientific gatherings of various kinds received comment in the last report. Suffice it to say that in the past year—an even busier one than the preceding—there was no evidence of a decline in skill, nor of any likely reduction in the growth rate of M.B.L. as a desired location for serious scientific colloquy, especially in the quieter seasons.

The whole effort can be exemplified by the efficiency with which a threatening overload of participants in the symposium held in honor of Jim Ebert (September 11–13) was handled. Some who wanted to stay here during that time could not, but there were no angry nor wounded confrontations. Almost everyone seeking to participate was accommodated in one way or another (and as far away as the Plaza end of Falmouth), and, as the audience grew with each passing day from 200 to Standing Room Only in the Lillie Auditorium, everyone was fed, and had the opportunity to ask questions and to be heard. It is not surprising that the enthusiasm giving the event its ambience was reflected in major reports of it in the scientific press. The work of our Public Relations Office contributed importantly to the symposium's success.

In addition to the Ebert Symposium, the following (among many more not mentioned) were scientific gatherings held this year at the M.B.L.: The Society of General Physiologists, the Molecular Biophysics and Biochemistry Conference of Yale, a meeting on International Environmental Problems sponsored by the National Academy of Sciences and arranged by George Woodwell, a Harvard Medical School conference on Immunology, the Northeast Regional meeting of the Animal Behavior Society, a meeting of the National Foundation for Cancer Research; and a visit of Massachusetts Senator Paul Tsongas with leading Woods Hole environmental scientists.

While it is not true that these influxes of our slide-and-manuscript-bearing colleagues from the big cities disturb the peace, the beauty, and the historic somnolence of wintertime in Woods Hole, it *is* true that the possibility of escape, in this place, into an absence of thought, has come to be desperately small.

#### FUND-RAISING AND COST RECOVERY

Near the end of 1979, the Chairman of our Board of Trustees, Prosser Gifford, announced the Laboratory's new, very ambitious, and first fully-organized, long term fund-raising campaign, which has been named, for obvious reasons, the M.B.L. Second Century Fund. The goals and the strategy of that effort are too complex and too important to risk its misunderstanding by a mere summary in this limited space (over which the new Biological Bulletin editor, Charles B. Metz, will exert just as jealous a control as did his predecessor, "Gus" Russell-Hunter). Suffice it to say that in this year the M.B.L. mounted its first comprehensively planned capital campaign, and that as of the time of writing the totals are well ahead of the scheduled target. A full discussion of the Second Century Fund will be made available to the Corporation before the end of the 1980 summer session.

The cold numbers of the outcome are not without interest, however, and those I will communicate: In the year ending December, 1979, the M.B.L. actually received \$1,215,144 in gifts, and those receipts were underpinned by firm pledges of an additional \$1,985,500. The provenance of these gifts is as varied as the specific (or unrestricted) purposes for which they were given, but the happy implication of the totals will be evident to anyone who examines our financial statements for prior years. Details are available elsewhere in this Report.

Considerable attention has been given in the past year to the much-vexed question of overhead-cost recovery for research and educational programs. Vexed it is; more so than in colleges, universities, and full-time research laboratories, because of the peculiar mixture of activities carried on at the M.B.L. Of course, few non-profit

institutions recover anything near the actual cost of mounting externally-sponsored research programs. The allowable charges for overhead are watched penuriously and renegotiated regularly by several agencies of government, all of which are rewarded for their effectiveness in saving money (which is as it should be). The M.B.L. recovers, unfortunately, a much smaller than average share of its costs. Among the reasons for this are (1) the space-rental method employed, which has built into it a required, but really inapplicable factor of "unused capacity" and a penalty based on it, (2) the danger that even if the rental rates were to be allowed to rise realistically, they would be too high for individual transient investigators to pay, (3) the fact that such payments are normally made as direct costs to research grants, while the parent institution recovers full, or nearly full indirect costs nevertheless, which is a form of double jeopardy, and (4) the fact that auditors and other contract officers of the granting agencies are poorly informed about the nature, scale, and value of M.B.L. operations. They have been inclined to deal with it as though it were a hospital or a kind of part-time college. Among the most troublesome consequences of the system and its inherent contradictions has been unpredictable change in rates from one year to the next, causing individual investigators much difficulty in the payment of bills.

Several good results have been obtained in the past year, in consequence of initiatives aimed at correcting the situation. The Directors of NIH and NSF have given strong and informed support to our brief to the auditors, seeking more realistic interim arrangements. The initiatives and that support have yielded the hoped-for relief in the form of an official agreement on rental rates, covering a three-year period and taking account of inflation, and a reduction in the penalty for so-called "unused capacity." Negotiations with the financial officers of both our major granting agencies have, furthermore, brought about a significant broadening—and a mutual one—of understanding, particularly as regards the elements of unfairness that remain features of a system that treats year-round, in-house research grants in the same way as the funds supporting transients.

All parties to these negotiations have agreed that a new, simpler, fairer system of overhead recovery for the M.B.L. is to be worked out and presented for preliminary review before the end of the 1980 calendar year. The intention is to bring it into operation by the summer of 1981. Simultaneously, we are exploring, with cooperation of the agencies, forms of *general* support direct to the M.B.L., for the transient research and the educational programs of this Laboratory (and of the other U. S. marine laboratories), with a view to minimizing the direct cost burden on the individual transient research worker.

There is every reason to believe that the cost in time and effort now being paid by us for these initiatives will yield a very much larger return in the future. Our goals for that future are very simple: They are to recover the costs (and no more than the costs) of research and teaching done at the M.B.L. (assuming that the quality thereof will not decline from the present), *and* to make program quality, rather than the ability to pay rent, the essential determiner of participation.

## MANAGEMENT

*Biological Bulletin.* Editorship of our journal has passed from the capable hands of W. D. Russell-Hunter to those of C. B. Metz. Russell-Hunter's was a distinguished tenure. He brought to the journal orderliness and efficiency that are rare among scientific journals in these times, and was able at the same time to impose upon it, without tyranny, something of the literacy and attention to detail that characterize his own writing. The Corporation owes him a debt of gratitude.

Charles Metz, in taking up the position's challenge, brings to it a broad experience in developmental and reproductive biology and in the management of educational enterprises. He intends to broaden the substantive range of *Biological Bulletin* articles, making the journal more representative of scientific interests of the Laboratory and

its current programs. This, however, he hopes to accomplish without diminution of editorial rigor, nor a decline of the high standard of style set by his predecessor. He will be aided by several new and accomplished members of the editorial board. We wish him and his associates good luck, and set down here an undertaking already made *viva voce* by Corporation members who were consulted in the editorial succession: to help make the *Bulletin* a more representative vehicle, and a primary vehicle, for important papers in fields pursued at the M.B.L., while at the same time adhering to the policies that have made it an international journal of wide distribution, rather than a mere house publication.

*The Board Chairman and The Treasurer.* Drs. Prosser Gifford and Robert Mainer are very busy men. Each holds a demanding position and each gives time and interest to a broad range of educational and community enterprises. It was therefore with some concern that we began to seek, during 1979, a distinctly larger commitment of their time to M.B.L. management problems and to fund raising. They have responded magnanimously, and I cannot let the opportunity pass to thank them publicly, for the Trustees and for the Corporation as a whole. As must be evident, even from the skeletal indications of this Report, our management task has multiplied in difficulty and complexity. There is little of Parkinson's Effect (*i.e.*, the expansion of management to fill all available space and budgets) in this. By the applicable standards, M.B.L.'s management team is very small for the size and complexity of the enterprise. This has been true in the past, and it is more strikingly true now. Yet the place *has* changed, as have the times and the requirements for getting support and employing people. A large part of our management team is volunteer: the time-consuming and difficult work of the Executive Committee, for example, is done without compensation for its members. The Board Chairman and the Treasurer, who are two of the members, have a particularly heavy burden of work. We have added to it by broadening the participation of Trustees in such important decisions as fund-raising initiatives, capital equipment and resources acquisitions, property management, and salary-setting. Drs. Gifford and Mainer have accepted these new responsibilities with good cheer and met them with skill. There is no way that we can pay them for the valuable time they have given, and will, we hope, continue to give, except by our honest gratitude.

*New Positions.* The Controller and the General Manager will shortly have the assistance of a skilled personnel officer, who will relieve them of the responsibilities they now bear for personnel management, while at the same time collaborating with them and with the Director in relevant new policy-making. This is a step long in review and long needed, particularly because however decent and familial our employer-employee relations have been (and they have been unusually so), the law now requires attention to record-keeping, to reporting, and to pension matters at a level of detail that cannot be managed by any one person part time.

In addition, the search has begun for a senior officer, at the level of Assistant Director, who will have broad responsibility in general administration and in the Laboratory's Planning and Development activities. This is a position whose creation is indispensable for a successful outcome of long-term plans for campus rehabilitation and for enlarging the endowment. The Laboratory has received a significant grant that will underwrite the costs of this office for the first few years, during which time its performance and contribution will be observed with care.

*Committees.* In that context the Executive Committee and the administration have begun to plan for a regular and orderly process of review, in which administrators *and* their positions will be subject to a study of performance, in quite the same way as staff scientists and support staff (and professors in universities) have their performances reviewed.

It is our hope in the coming year to enlist a much closer involvement of all Trustees, and of Corporation members generally, in such processes. A deliberate and thorough review of membership rotation for the standing committees was begun early in 1979. It continues to make visible and useful progress. The work of the Library Com-



mittee is particularly worthy of mention in this regard. Under the Chairmanship of Edward Adelberg, this broadly-based committee has made a study of a perennial trouble-subject: the management of our superb Library. The final report to the Corporation is due at the end of the 1980 summer session, but interim reports, combined with a new and heartening spirit of cooperation among the senior administrators of this Laboratory and of the Woods Hole Oceanographic Institution, have already produced important agreements. Among them is a fairer distribution of effort and budgetary support for the Library than ever before.

It is now clear that the final Library proposals will entail no threatening discontinuities of style or services, but that they will at the same time result in a signal improvement of the Library's holdings, specialized services, and capability for attracting external support.

### CONCLUSION

I return, finally, to the broader issues of constitution and government with which this report began. We have made every effort to control the changes taking place in the M.B.L.'s size, range of programs, and facilities, in such a way as to minimize (although, unfortunately, not to eliminate) dislocations and inconvenience. The directions of change have prior Corporation agreement: rehabilitation of the campus, so as to fit it for the kinds of research and teaching now done here (and to be done here in the future); the addition of certain new facilities, such as the much-needed marine resources center, the environmental sciences center, and a carefully planned expansion of housing; consolidation and strengthening of year-round programs within the context of the M.B.L. program as a whole, and without long-term infringement of the transient programs; reorganized management of endowment and properties. What has not, and necessarily not, been argued in nearly so much detail is the machinery of governance by which these changes are to be brought about. John Calhoun's wry but perfectly accurate assessment of the central issue applies: government (or management) there must be, but the rules for it, or the constitution, must have an inherent flexibility sufficient to deal with change *and* to prevent tyranny. Even so the rules must be changed from time to time.

This is hardly the place for a listing of the issues of governance about which we shall have to confer, since a report is, after all, concerned with past and present, rather than with the future. An indication of the nature of those issues would not, however, be inappropriate. We need a reexamination of the role played by our Trustees, and particularly by the Board Trustees. We need some new understandings, if not more rules, about administration generally: how big it needs to be and ought to be, for this unique institution, and how its quality, whatever the agreed size, is to be maintained. We need understandings as to how the Laboratory's scientific programs are to be kept under some reasonable central control, as is demanded increasingly by granting agencies, while at the same time insisting that administration exists to serve the programs, rather than the reverse.

The changes required for the M.B.L.'s survival in strength into its second century are large. Let us hope that an equally large recommitment to watchfulness, to participation, *and* to good will can be made this year by the Corporation membership and, indeed, by all friends of the Laboratory, as the countdown to our second century begins.

### VII. TREASURER'S REPORT

The Laboratory achieved its 1979 financial objective of maintaining parity between revenues and expenses. In fact, a modest surplus of \$31,000 was recorded—a gratifying improvement over the operating deficits of 1978 and 1977. However, this result does not include provision for depreciation on the Labora-

tory's physical plant and equipment, about which I shall have more to say in my concluding comments.

Aggregate revenues of \$4,766,000 in 1979 were \$509,000 greater than in the prior year. Among the more important contributors to the increase are the following:

- \$140,000 in additional laboratory fees and overhead recoveries. A significant factor here was a 13 percent increase in the approved overhead rate for federal grants and contracts (\$30.50 in 1978 to \$34.60 in 1979).
- \$74,000 in additional total investment income, partly resulting from higher rates on short-term investments and partly from improved returns on endowment and quasi-endowment funds which, since February, 1979, have been under full-time professional supervision.
- \$443,000 in additional federal funding of direct costs of research performed under grants and contracts.

Offsetting a portion of the above increases was a decline in unrestricted gifts—\$115,000 in 1979 versus \$241,000 in 1978. However, gift income tends to be unpredictably variable. For example, 1978 saw the receipt of a gift of real estate and an unusually large foundation gift. As we build the momentum of the Laboratory's Second Century Fund campaign, we are likely to see even greater variability in unrestricted gifts, both because some longtime contributors will temporarily shift their attention to the Laboratory's capital needs and because the campaign may elicit a certain number of gifts from donors who prefer not to contribute to "bricks and mortar."

Aggregate expenses increased \$442,000 in 1979, reaching a total of \$4,735,000. Much of this resulted from the flow-through of expenses associated with the higher level of federal contract research noted in the discussion of income. Inflation's shadow darkened virtually every category of costs in 1979 and glooms the coming months even more. I am impressed by the performance of the Laboratory's administration and staff in controlling expenses, often achieved by uncommon ingenuity in the use of limited resources.

During 1979, the Woods Hole Oceanographic Institution and the Marine Biological Laboratory reached agreement on a formula for sharing joint library costs. As a result, we now have a more logical and predictable method for reimbursement of the costs of acquiring and managing library resources for the joint benefit of WHOI and MBL.

Also during 1979, the MBL negotiated a fixed three-year (1980–82) overhead rate with its government auditors. The three-year period, in contrast to the former year-to-year approvals, enables investigators to more accurately budget for multi-year research projects and permits the Laboratory to better estimate its income.

The Laboratory's 1980 budget aims at an objective of \$69,000 of revenues in excess of expenses, before provision for depreciation. Its achievement will be difficult. In addition to inflation's toll, the Laboratory will face the added expenses of the steps being taken to assure its future. In particular, monies must be spent now to organize and conduct the substantial fund raising effort to rehabilitate an aging physical plant, add facilities and increase endowment.

This brings me to the point I must make about the Laboratory's long standing practice of not funding the depreciation of its physical assets. It is tempting to conclude that the Laboratory is doing well if its revenues cover cash outlays. Such a conclusion brings an illusory comfort. Depreciation, although a non-cash

expense, reflects the loss in value of assets attributable to deterioration and obsolescence. Moreover, in inflationary periods, stated depreciation underestimates the cost of replacing assets acquired or built during earlier times.

The alternative to the funding of depreciation—assuming we are not willing to permit catabolic processes to overtake the Laboratory's viability—is to dedicate ourselves to periodic aggressive fund raising to generate the means by which the MBL's physical plant can be maintained, repaired, rehabilitated or, in some cases, replaced. It is for this reason that the recently announced Second Century campaign is vitally important and deserving of the help of everyone associated with the Laboratory.

## COOPERS & LYBRAND

CERTIFIED PUBLIC ACCOUNTANTS

A MEMBER FIRM OF  
COOPERS & LYBRAND (INTERNATIONAL)

To the Trustees of  
Marine Biological Laboratory  
Woods Hole, Massachusetts

We have examined the balance sheets of Marine Biological Laboratory as of December 31, 1979 and 1978, and the related statements of current funds revenues, expenditures, and other changes and changes in fund balances for the years then ended. Our examinations were made in accordance with generally accepted auditing standards and, accordingly, included confirmation from the custodians of securities owned at December 31, 1979 and 1978, and such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

As more fully described in Note C to the financial statements, the Laboratory excludes certain costs of buildings and equipment from the balance sheet. In our opinion, generally accepted accounting principles require that such costs be included as investment in plant in the financial statements.

In our opinion, except for the effects on the financial statements of the matter discussed in the preceding paragraph, the aforementioned financial statements present fairly the financial position of Marine Biological Laboratory at December 31, 1979 and 1978, and its current funds revenues, expenditures and other changes and the changes in fund balances for the years then ended, in conformity with generally accepted accounting principles applied on a consistent basis.

Boston, Massachusetts  
March 21, 1980

*Coopers & Lybrand*

## MARINE BIOLOGICAL LABORATORY

## BALANCE SHEETS

December 31, 1979 and 1978

<i>Assets</i>	<i>1979</i>	<i>1978</i>
<i>Current Funds:</i>		
Unrestricted:		
Cash, including deposits at interest	\$ 424,763	\$ 382,396
Money market securities	500,000	—
Accounts receivable, net of allowance for uncollectible accounts of \$1,716 in 1979 and \$4,500 in 1978	858,466	699,708
Other assets	11,186	15,367
Due to restricted current funds	(729,275)	(278,075)
Due (to) from invested funds	(8,151)	103,248
Total unrestricted	<u>1,056,989</u>	<u>922,644</u>
Restricted:		
Cash	12,285	18,973
Investments, at cost; market value: 1979—\$1,881,590; 1978—\$1,297,551 (Notes B and F)	1,900,292	1,297,530
Due from unrestricted current fund	729,275	278,075
Due from invested funds	350,967	260,967
Total restricted	<u>2,992,819</u>	<u>1,855,545</u>
Total current funds	<u>\$ 4,049,808</u>	<u>\$ 2,778,189</u>
<i>Invested Funds:</i>		
Cash	5,589	6,982
Investments, at cost; market value: 1979—\$4,250,838; 1978—\$3,950,184 (Notes B and F)	3,936,137	4,084,003
Due (to) from unrestricted current fund	8,151	(103,248)
Due to restricted current funds	(350,967)	(260,967)
Total invested funds	<u>\$ 3,598,910</u>	<u>\$ 3,726,770</u>
<i>Plant Fund:</i>		
Land, buildings and equipment at cost (Note C)	12,258,651	12,421,929
Less accumulated depreciation	4,251,598	4,060,407
Total plant fund	<u>\$ 8,007,053</u>	<u>\$ 8,361,522</u>

The accompanying notes are an integral part of the financial statements.

## MARINE BIOLOGICAL LABORATORY

## BALANCE SHEETS

December 31, 1979 and 1978

<i>Liabilities and Fund Balances</i>	<i>1979</i>	<i>1978</i>
<i>Current Funds:</i>		
Unrestricted:		
Accounts payable and accrued expenses	\$ 268,369	\$ 316,657
Deferred income	68,006	61,432
Fund balance	720,614	544,555
Total unrestricted	<u>1,056,989</u>	<u>922,644</u>
Restricted:		
Fund balances:		
Unexpended gifts and grants	2,897,679	1,777,677
Unexpended income of endowment funds	95,140	77,868
Total restricted	<u>2,992,819</u>	<u>1,855,545</u>
Total current funds	<u>\$4,049,808</u>	<u>\$2,778,189</u>
<i>Invested Funds:</i>		
Endowment funds	1,918,170	2,174,027
Quasi-endowment funds	934,143	934,143
Retirement fund (Note D)	746,597	618,600
Total invested funds	<u>\$3,598,910</u>	<u>\$3,726,770</u>
<i>Plant Fund:</i>		
Invested in plant	8,007,053	8,361,522
Total plant fund	<u>\$8,007,053</u>	<u>\$8,361,522</u>

The accompanying notes are an integral part of the financial statements.

MARINE BIOLOGICAL LABORATORY  
 STATEMENTS OF CURRENT FUNDS REVENUES, EXPENDITURES, AND OTHER CHANGES  
 for the years ended December 31, 1979 and 1978

	<i>Unrestricted</i>		<i>Restricted</i>		<i>Total</i>	
	1979	1978	1979	1978	1979	1978
<i>Revenues:</i>						
Instruction:						
Tuition	\$ 238,378	\$ 236,391	\$ 15,500	\$ 43,100	\$ 253,878	\$ 279,491
Grants and contracts:						
Government	19,788	7,360	215,719	215,759	235,507	223,119
Private			53,887	70,446	53,887	70,446
Research:						
Laboratory rentals	565,631	503,576			565,631	503,576
Grants and contracts:						
Government	283,770	206,741	1,304,680	861,515	1,588,450	1,068,256
Private	79,468	90,550	225,887	290,402	305,355	380,952
Dormitory	319,010	320,020			319,010	320,020
Dining Hall	179,507	157,270			179,507	157,270
Library	130,609	135,028			130,609	135,028
Biological Bulletin	87,416	86,171			87,416	86,171
Support departments:						
Research services	220,914	187,741			220,914	187,741
Marine resources	92,277	79,822			92,277	79,822
Investment income	171,215	159,703	188,641	141,707	359,856	301,410
Gifts	114,520	240,563	120,178	132,864	234,698	373,427
Other	139,491	91,141			139,491	91,141
Total revenues	2,641,994	2,502,077	2,124,492	1,755,793	4,766,486	4,257,870

	Unrestricted		Restricted		Total	
	1979	1978	1979	1978	1979	1978
<i>Operating expenditures:</i>						
Instruction	214,687	194,993	132,387	219,587	347,074	414,580
Research	(7,019)	3,813	1,675,172	1,264,631	1,668,153	1,268,444
Scholarships and stipends			236,958	216,958	236,958	216,958
Dormitory	143,794	135,769			143,794	135,769
Dining Hall	169,604	149,249			169,604	149,249
Library	252,713	235,401			288,802	258,158
Biological Bulletin	84,082	87,273	36,089	22,757	84,082	87,273
Support departments:						
Research services	355,719	354,485	5,000	25,400	360,719	379,885
Marine resources	226,690	218,794		34	226,690	218,828
Administration	567,396	514,204	36,314	4,263	603,710	518,467
Plant operation	602,969	643,550	2,572	2,163	605,541	645,713
Total expenditures	2,610,635	2,537,531	2,124,492	1,755,793	4,735,127	4,293,324
Excess (deficit) of revenues	31,359	(35,454)	—	—	31,359	(35,454)
<i>Transfers and additions:</i>						
Excess of restricted gifts, grants and investment income received over amounts expended						
From plant fund—proceeds of sale of plant assets	144,700	(47,342)	1,137,274	188,173	1,137,274	188,173
To plant fund—donated unrestricted real estate					144,700	(47,342)
Net transfers and additions	144,700	(47,342)	1,137,274	188,173	1,281,974	140,831
Net increase (decrease) in fund balances	\$ 176,059	\$ (82,796)	\$1,137,274	\$ 188,173	\$1,313,333	\$ 105,377

The accompanying notes are an integral part of the financial statements.

## MARINE BIOLOGICAL LABORATORY

## STATEMENTS OF CHANGES IN FUND BALANCES

for the years ended December 31, 1979 and 1978

	Current Funds		Invested Funds			Plant Fund
	Unrestricted	Restricted	Endowment	Quasi-Endowment	Retirement	
<i>1978</i>						
Balances at December 31, 1977	\$ 627,351	\$ 1,667,372	\$2,172,160	\$934,143	\$540,202	\$8,596,042
<i>Increases:</i>						
Unrestricted current fund revenues	2,502,077					
Grants and gifts		2,054,971				
Realized net gains on sale of investments			1,867			
Investment income		150,546			32,013	
Addition to pension fund					65,573	
Tuition		43,100				
<i>Decreases:</i>						
Instruction, research and general expenditures	(2,537,531)					
Indirect costs		(1,755,793)				
Payments to pensioners		(304,651)				
Depreciation					(19,188)	(281,862)
<i>Transfers—additions (deductions):</i>						
Transfer to plant fund	(47,342)					47,342
Balances at December 31, 1978	544,555	1,855,545	2,174,027	934,143	618,600	8,361,522



	Current Funds		Invested Funds			Plant Fund
	Unrestricted	Restricted	Endowment	Quasi-Endowment	Retirement	
<i>Increases</i>						
Unrestricted current fund revenues	2,641,994					
Grants and gifts		3,422,789			38,148	144,700
Investment income		206,503				
Proceeds of sale of equipment					113,062	
Addition to pension fund		15,500				
Tuition						
<i>Decreases:</i>						
Instruction, research and general expenditures	(2,610,635)	(2,124,492)				
Indirect costs		(383,026)				
Realized net losses on sale of investments			(255,857)		(23,213)	(76,455)
Payments to pensioners						(278,014)
Net book value of equipment sold						
Depreciation						(144,700)
<i>Transfers—additions (deductions):</i>						
Proceeds of sale of equipment	144,700					
Balances at December 31, 1979	\$ 720,614	\$ 2,992,819	\$1,918,170	\$934,143	\$746,597	\$8,007,053

The accompanying notes are an integral part of the financial statements.

## MARINE BIOLOGICAL LABORATORY

## NOTES TO FINANCIAL STATEMENTS

A. *Purpose of the Laboratory:*

The purpose of Marine Biological Laboratory (the "Laboratory") is to establish and maintain a laboratory or station for scientific study and investigations, and a school for instruction in biology and natural history.

B. *Significant Accounting Policies:**Basis of Presentation—Fund Accounting*

In order to ensure observance of limitations and restrictions placed on the use of resources available to the Laboratory, the accounts of the Laboratory are maintained in accordance with the principles of "fund accounting." This is the procedure by which resources are classified into separate funds in accordance with activities or objectives specified. In the accompanying financial statements, funds that have similar characteristics have been combined.

Externally restricted funds may only be utilized in accordance with the purposes established by the source of such funds. However, the Laboratory retains full control over the utilization of unrestricted funds. Restricted gifts, grants, and other restricted resources are accounted for in the appropriate restricted funds. Restricted current funds are reported as revenue when expended for current operating purposes. Unrestricted revenue is reported as revenue in the unrestricted current fund when received.

Endowment funds are subject to restrictions requiring that the principal be invested and only the income utilized. Quasi-endowment funds have been established by the Laboratory for the same purposes as endowment funds, however, any portion of these funds may be expended. Certain accounts for the prior year have been reclassified to the current reporting format.

*Investments*

Investments purchased by the Laboratory are carried at cost. Investments donated to the Laboratory are carried at fair market value at date received. For determination of gain or loss upon disposal, cost is determined based on the specific identification method.

*Investment Income and Distribution*

The Laboratory follows the accrual basis of accounting except that investment income is recorded on a cash basis. The difference between such basis and the accrual basis does not have a material effect on the determination of investment income earned on a year-to-year basis.

Investment income includes income from the investments of specific funds and from the pooled investment account. Income from the pooled investment account is distributed to the participating funds on the basis of the market value at the beginning of the quarter, adjusted for the cost of any additions or disposals during the quarter.

C. *Land, Buildings and Equipment:*

Following is a summary of the plant fund assets:

<i>Classification</i>	<i>1979</i>	<i>1978</i>
Land	\$ 639,693	\$ 639,693
Buildings	10,190,430	10,190,430
Equipment	1,428,528	1,591,806
	<u>12,258,651</u>	<u>12,421,929</u>
Less accumulated depreciation	4,251,598	4,060,407
	<u>\$ 8,007,053</u>	<u>\$ 8,361,522</u>

The original cost of land, buildings and related initial furnishing equipment is capitalized when the assets are acquired. The cost of subsequent additions and purchases, repairs and remodeling is expensed when incurred. Equipment and remodeling expenditures amounted to approximately \$76,000 and \$125,000 in 1979 and 1978, respectively.

Depreciation is computed using the straight-line method over estimated useful lives of 40 years for buildings and 20 years for equipment.

D. *Retirement Fund:*

The Laboratory has a noncontributory pension plan for substantially all full-time employees which complies with the requirements of the Employee Retirement Income Security Act of 1974. The actuarially determined pension expenses charged to operations in 1979 and 1978 were \$81,892 and \$65,673, respectively. The Laboratory's policy is to fund pension costs accrued.

E. *Pledges and Grants:*

As of December 31, 1979 and 1978, the following amounts remain to be received from previous gifts and grants for specific research and instruction programs, and are expected to be received as follows:

	<i>December 31, 1979</i>		<i>December 31, 1978</i>	
	<i>Unrestricted</i>	<i>Restricted</i>	<i>Unrestricted</i>	<i>Restricted</i>
1979			\$34,666	\$2,161,535
1980	\$ 50,500	\$3,689,270		28,000
1981	49,000	215,000		
1982	15,000			
	<u>\$114,500</u>	<u>\$3,904,270</u>	<u>\$34,666</u>	<u>\$2,189,535</u>

F. *Investments:*

The following is a summary of the cost and market value of investment assets at December 31, 1979 and 1978, and the related investment income and disposition of investment income for the years ended December 31, 1979 and 1978.

	<i>Cost</i>		<i>Market</i>		<i>Investment Income</i>	
	1979	1978	1979	1978	1979	1978
U. S. Government securities	\$ 986,397	\$ 610,661	\$ 930,834	\$ 594,205	\$ 88,030	\$ 35,718
Corporate fixed income obligations	1,162,164	689,185	1,038,929	583,572	64,683	42,969
Common stocks	1,705,817	2,080,664	2,213,951	2,123,631	142,530	131,333
Preferred stocks	64,210	83,032	49,575	54,548	2,976	3,654
Units in combined pension fund	—	602,912	—	576,679	(1,719)	33,114
Real estate (market at cost)	17,549	17,549	17,549	17,549		
Total	\$3,936,137	\$4,084,003	\$4,250,838	\$3,950,184	\$296,500	\$246,788
Less custodian fees					23,794	14,867
					272,706	231,921

	Cost		Market		Investment Income	
	1979	1978	1979	1978	1979	1978
<i>Current Restricted Funds:</i>						
U. S. Government securities	\$1,900,292	\$1,297,530	\$1,881,590	\$1,297,551	118,707	86,807
<i>Current Unrestricted Funds:</i>						
Earned on corporate savings accounts and money market funds					24,453	23,534
Investment income					\$415,866	\$342,262

*Disposition of Investment Income:*

Restricted for current use:

Utilized in current operations	188,641
Available for future operations	17,862
Total restricted current funds	206,503
Retirement fund	38,148
Unrestricted—utilized in current operations	171,215
	\$415,866
	\$342,262

*Current Restricted Funds:*

U. S. Government securities

*Current Unrestricted Funds:*

Earned on corporate savings accounts and money market funds

Investment income

Restricted for current use:

Utilized in current operations	188,641
Available for future operations	17,862
Total restricted current funds	206,503
Retirement fund	38,148
Unrestricted—utilized in current operations	171,215
	\$415,866
	\$342,262

## VIII. REPORT OF THE LIBRARIAN

The Library received a marvelous gift of \$450,000 from the Andrew W. Mellon Foundation! Relief is now in sight for our never-ending space problem, as much of this money is earmarked for renovation for the Library section of the Lillie Building. Plans are underway to move all the Administration offices to the Candle House within the next year or so, and the present space occupied by these offices will become part of the Library. Tentative plans call for the removal of the Reprint Collection from the basement stack to a section of the main administration area thereby releasing this lower stack for expansion of the journal collection. Eventually the book section on Stack Three will be moved to the third floor, (where a section of the book collection is already housed) so that ultimately all five stacks will hold the entire journal collection, from A to Z.

Agreements were reached with the Woods Hole Oceanographic Institution involving joint cost-sharing arrangements for: 1) approximately 500 journal subscriptions; 2) staff salaries; 3) major reference collections of interest to both institutions; 4) space costs; 5) physical renovations. This was a major move toward a joint cooperative effort involving both MBL and WHOI in maintaining and expanding the Library in the years to come.

A Library questionnaire was prepared with the help of many users and the members of the Library Committee. This was mailed at the end of December to 2,400 past and present users of the Library. The results will be tabulated and published in the 1980 report.

## IX. EDUCATIONAL PROGRAMS

## SUMMER

## EMBRYOLOGY

*Instructors-in-chief*

HUMPHREYS, TOM D., University of Hawaii  
 RUDERMAN, JOAN V., Harvard Medical School

*Other faculty, staff, and lecturers*

BENDER, W., California Institute of Technology  
 BOTSTEIN, D., Massachusetts Institute of Technology  
 BRANDHORST, B., McGill University, Canada  
 CRAIN, W., Worcester Foundation for Experimental Biology  
 CRAWFORD, WILLIAM, Stanford University  
 DE ROBERTIS, E., Cambridge University, England  
 DOLECKI, GREGORY J., University of Hawaii  
 EFSTRATIADIS, A., Harvard Medical School  
 ERNST, V., Massachusetts Institute of Technology  
 FREGIEN, NEVIS, University of Hawaii  
 GROSS, PAUL, Marine Biological Laboratory  
 HAHN, W., University of California  
 HEREFORD, L., Brandeis University  
 HUNT, T., Cambridge University, Cambridge, England  
 KEDES, L., Stanford University  
 LODISH, H., Massachusetts Institute of Technology  
 NEWROCK, K., McGill University, Canada

RAFF, R., Indiana University  
 REEDER, R., Hutchinson Cancer Center  
 RICE, DOUGLAS, University of Hawaii  
 ROSBASH, M., Brandeis University  
 ROSENTHAL, ERIC, Harvard Medical School  
 RUBIN, G., Harvard Medical School  
 SCHMIDT, LYN, Harvard Medical School  
 SOUTHERN, E., University of Edinburgh, Edinburgh, Scotland  
 TANSEY, TERESE, Harvard Medical School  
 VILLA-KOMAROFF, L., University of Massachusetts, Worcester  
 WEINTRAUB, H., Hutchinson Cancer Center  
 WHITTAKER, J. R., Wistar Institute, Philadelphia  
 WINKLER, M., University of California, Berkeley  
 ZACKS, SUSAN, Providence, Rhode Island  
 ZIFF, E., Rockefeller University

### *Students<sup>1</sup>*

\*BAKER, ELLEN, Wesleyan University  
 \*BALLINGER, DENNIS, Massachusetts Institute of Technology  
 \*BANNON, GARY, Iowa State University  
 \*BOARDMAN, MARK, University of Hawaii, Kewalo Marine Laboratory  
 \*BUDORICK, NANCY, University of Illinois, Chicago  
 \*DAWKINS, BEVERLY, Atlanta University  
 \*DEMARCHEZ, MICHEL, University of Grenoble, France  
 \*DEUTSCH, STEPHEN, California State University, Long Beach  
 \*DURICA, DAVID, Worcester Foundation for Experimental Biology  
 \*EARL, CHRISTOPHER, Stanford University  
 \*HAMMOND, MARTIN, University of Washington  
 \*HASTINGS, KENNETH, University of Virginia  
 \*HOROVITCH, SHARON, Massachusetts Institute of Technology  
 \*KOLEGA, JOHN, Yale University  
 \*LEVER, PEGGY, University of Connecticut  
 \*MCLANE, JOHN, University of Rhode Island  
 \*MICKEL, FRANCES, University of North Carolina  
 \*MURRAY, ANDREW, Harvard University  
 \*PETERSON, J. SCOTT, University of Texas  
 \*PHILLIPS, WILLIAM, University of Virginia  
 \*SCHLOSS, JEFFERY, Yale University  
 \*SERUNIAN, LESLIE, Harvard University  
 \*SMITH, JONATHAN, Harvard Medical School  
 \*SMOUSE, DAVID, Stanford University  
 \*WINKLER, MATTHEW, University of California, Berkeley  
 \*YONEMOTO, WES, SUNY at Stony Brook

### EXPERIMENTAL MARINE BOTANY

#### *Instructor-in-chief*

SCHIFF, JEROME A., Brandeis University

#### *Other faculty, staff, and lecturers*

AHMADJIAN, VERNON, Clark University  
 ALBERTE, RANDALL S., University of Chicago

<sup>1</sup> All summer students listed completed the formal course programs. Asterisk indicates those completing post-course research sessions.

COLEMAN, ANNETTE, Brown University  
 ELLIS, RICHARD, Bucknell University  
 FIORE, JAMES, Suffolk University  
 GAFFRON, HANS, University of Florida (retired)  
 GIBSON, JANE, Cornell University  
 GOLDFINE, STEVEN, SUNY at Stony Brook  
 GUILLARD, ROBERT L., Woods Hole Oceanographic Institution  
 LOEWUS, FRANK A., Washington State University  
 LYMAN, HARVARD, SUNY at Stony Brook  
 MAUZERALL, DAVID, Rockefeller University  
 MCCANDLESS, ESTHER L., McMaster University  
 PRICE, CARL, Rutgers University  
 QUATRANO, RALPH S., Oregon State University  
 SCHATZ, SCOTT, University of Massachusetts  
 SEARS, JAMES R., Southeastern Massachusetts University  
 STEPHENS, RAYMOND E., Marine Biological Laboratory  
 STERN, ARTHUR I., University of Massachusetts  
 TROXLER, ROBERT, Boston University  
 WILCE, ROBERT, University of Massachusetts

### *Students<sup>1</sup>*

CHRISTIANSON, JOHN, University of Bridgeport  
 EGAN, KATHLEEN, Southern Illinois University  
 \*FREY, MARICA, Oberlin College  
 FRIEDMAN, ALAN, Humboldt State University  
 \*GUSTAFSON, DAREL, University of Bridgeport  
 HAYHOME, BARBARA, University of Nebraska  
 HICKS, HERALINE, Atlanta University  
 \*HOGAN, ARTHUR, University of Rochester  
 KLARER, CONSTANCE, DePauw University  
 \*KURSAR, THOMAS, University of Chicago  
 \*MAZZELLA, LUCIA, Stazione Zoologica di Napoli, Italy  
 PATRICK, JANE, University of Louisville  
 \*PENNCAVAGE, NANCY, SUNY at Stony Brook  
 RUDNICK, MARLA, Yale University  
 \*SQUIER, THOMAS, Oberlin College  
 \*THALER, DAVID, University of Massachusetts, Boston

### MARINE ECOLOGY

#### *Instructors-in-chief*

TEAL, JOHN M., Woods Hole Oceanographic Institution  
 VALIELA, IVAN, Boston University/Marine Biological Laboratory

#### *Other faculty, staff, and lecturers*

CAPPUZO, JUDITH, Woods Hole Oceanographic Institution  
 COLE, TIMOTHY J., Boston University/Marine Biological Laboratory  
 COWLES, TIMOTHY, Woods Hole Oceanographic Institution  
 GIESELMAN, JOY, Woods Hole Oceanographic Institution  
 GRASSLE, J. FREDERICK, Woods Hole Oceanographic Institution  
 HOBBIIE, JOHN, Marine Biological Laboratory  
 HOWARTH, ROBERT, Marine Biological Laboratory  
 JACKSON, JEREMY B. C., Johns Hopkins University  
 JANNASCH, HOLGER, Woods Hole Oceanographic Institution  
 JEFFERIES, ROBERT L., University of Toronto



MADIN, LARRY, Woods Hole Oceanographic Institution  
 MANN, ROGER, Woods Hole Oceanographic Institution  
 MORRIS, JAMES, Marine Biological Laboratory  
 ODUM, WILLIAM, University of Virginia  
 PAINE, ROBERT, University of Washington  
 PETERSON, BRUCE, Marine Biological Laboratory  
 PETERSON, SUSAN, Woods Hole Oceanographic Institution  
 SANDERS, HOWARD, Woods Hole Oceanographic Institution  
 STEELE, JOHN, Woods Hole Oceanographic Institution  
 TENORE, KENNETH, Skidaway Institute of Oceanography  
 VAN RAALTE, CHARLENE, Hampshire College  
 VAN RAALTE, CHRISTOPHER, Hampshire College  
 WERME, CHRISTINE, Boston University/Marine Biological Laboratory  
 WIEBE, PETER, Woods Hole Oceanographic Institution  
 WILTSE, WENDY, Woods Hole Oceanographic Institution

### *Students<sup>1</sup>*

ANDERSON, LESLIE, Oberlin College  
 \*BLACKWELL, KATHERINE, Oberlin College  
 \*BOYNTON, JOHN  
 \*CHEN, PETER, Stanford University  
 \*CONDE, JESUS, Gran Mariscal de Ayacucho, Venezuela  
 \*DELSING, SELMA, Caribbean Marine Biological Institute  
 \*FORD, TIMOTHY, Sussex University, England  
 \*FULTON, LAURIE, Hampshire College  
 \*GALE, JUDITH, University of Massachusetts, Boston  
 KISELICA, DARIA, Seton Hill College  
 \*KREITLER, VIRGINIA, University of Pennsylvania  
 \*MCHENRY, THOMAS, Yale University  
 \*MCKINNEY, LAURIE, Stephens College  
 \*MEISSINGER, JOYCE, University of California, San Diego  
 \*MERCER, DANIEL, University of Texas, Austin  
 \*OLSON, DEANNA, University of California, San Diego  
 \*PATON, DAVID, Edgartown, Massachusetts  
 \*PHILLIPS, NEAL, University of Georgia  
 \*POURREAU, CATHERINE, College of Wooster  
 \*SHELTON, MARK, Colorado State University  
 THOMAS, WILLIAM, University of California, San Diego

## MICROBIAL ECOLOGY

### *Instructors-in-chief*

HALVERSON, HARLYN O., Brandeis University  
 JANNASCH, HOLGER W., Woods Hole Oceanographic Institution

### *Other faculty, staff, and lecturers*

ALEXANDER, MARTIN, Cornell University  
 ATWOOD, KIMBALL C., Columbia University  
 CUHEL, RUSSELL L., Woods Hole Oceanographic Institution  
 DASTOOR, VERNOUR, National Aeronautics and Space Administration  
 DAVIS, BERNARD D., Harvard University  
 DEMAIN, ARNOLD L., Massachusetts Institute of Technology  
 DESMARIS, DAVID J., Ames Laboratories, Moffet Field  
 FARRINGTON, JOHN W., Woods Hole Oceanographic Institution  
 GIBSON, JANE A., Cornell University

GOLDMAN, JOEL C., Woods Hole Oceanographic Institution  
HANSON, RICHARD S., University of Wisconsin  
HASTINGS, J. WOODLAND, Harvard University  
HOLLAND, HEINRICH D., Harvard University  
KEOSIAN, JOHN, Marine Biological Laboratory  
KORNBERG, HANS, Cambridge University, England  
LANYI, YANOS, Ames Laboratories, Moffet Field  
LEADBETTER, EDWARD R., University of Connecticut  
MAHLER, HENRY R., Indiana University  
MARGULIS, LYNN, Boston University  
ORÓ, JOHN, University of Houston  
PECK, HARRY D., University of Georgia  
POINDEXTER, JEANNE S., Public Health Research Institute, New York  
RICH, ALEX, Massachusetts Institute of Technology  
RICH, JOSIAH D., Columbia University  
SAGER, RUTH, Harvard University  
SCHLESINGER, WALTER R., Rutgers University  
STANIER, ROGER Y., Institut Pasteur, France  
TAYLOR, CRAIG D., Woods Hole Oceanographic Institution  
VALIELA, IVAN, Marine Biological Laboratory  
VAN HOLDE, KENSAL E., Oregon State University  
VARON, MAZAL, The Hebrew University, Jerusalem, Israel  
VINCENT, WALTER S., University of Delaware  
WOESE, CARL, University of Illinois, Urbana  
WALTER, JAMES, Arecibo Laboratories, Puerto Rico  
WILSON, EDWARD O., Harvard University  
WOODWELL, GEORGE M., Marine Biological Laboratory

#### *Students<sup>1</sup>*

AALSETH, CAROLE, Virginia Polytechnic Institute and State University  
\*ASHENDORF, DEBRA, Boston University  
FACHON, SUZANNE, University of Vermont  
\*KELLER, JANIS, University of New Hampshire  
\*KUSERK, FRANK T., Moravian College  
\*MILLS, DAVID, University College of North Wales, United Kingdom  
\*UHLINGER, DAVID J., University of Nebraska  
\*VALERA, FRANCISCO, Colegio Universitario, Alicante, Spain  
WILLIAMS, BETSY L., University of Washington

#### NEUROBIOLOGY

##### *Instructor-in-chief*

KRAVITZ, EDWARD A., Harvard Medical School

##### *Other faculty, staff, and lecturers*

ARMSTRONG, C., University of Pennsylvania  
BATTELLE, B., National Institutes of Health  
BIZZI, E., Massachusetts Institute of Technology  
COHEN, JONATHAN B., Harvard Medical School  
FINKELSTEIN, A., Albert Einstein University  
FISCHBACH, GERALD D., Harvard Medical School  
FURSHPAN, EDWIN J., Harvard Medical School  
GAINER, H., National Institutes of Health  
GESCHWIND, N., Harvard Medical School  
GLUSMAN, S., Harvard Medical School  
GOY, M., Harvard Medical School

GUTHRIE, M., Committee to Combat Huntingtons Disease  
 HALL, LINDA, Massachusetts Institute of Technology  
 HARRIS-WARRICK, R., Harvard Medical School  
 HERBERT, E., University of Oregon  
 HILDEBRAND, JOHN G., Harvard Medical School  
 HUBEL, D. H., Harvard Medical School  
 HUMPHREYS, T., University of Hawaii  
 LAFRATTA, J., Harvard Medical School  
 LANDIS, DENNIS, Harvard Medical School  
 LANDIS, STORY C., Harvard Medical School  
 LASEK, R., Case Western Reserve University  
 LESTER, H., California Institute of Technology  
 LLINAS, R., New York University  
 MACLEISH, PETER R., Harvard Medical School  
 MATSUMOTO, S., Harvard Medical School  
 NEUBIG, R., Harvard Medical School  
 O'LAGUE, PAUL, University of California, Los Angeles  
 ORNBERG, R., National Institutes of Health  
 POLLARD, H., National Institutes of Health  
 POTTER, CAMILLA, Swarthmore College  
 POTTER, DAVID D., Harvard Medical School  
 RAHAMIMOFF, R., Hebrew University, Jerusalem  
 RAVIOLA, E., Harvard Medical School  
 REESE, B., National Institutes of Health  
 REESE, T. S., National Institutes of Health  
 RHEUBEN, M., Pennsylvania State University  
 ROSE, B., University of Miami Medical School  
 SALPETER, M., Cornell University  
 SCHROEDER, B., National Institutes of Health  
 SHOTTON, D., Imperial College, London  
 SIEGEL, RUTH, Harvard Medical School  
 SUGA, N., Washington University, St. Louis  
 WASSERMAN, J., Pennsylvania State College  
 WEXLER, N., NINCDs

### *Students<sup>1</sup>*

\*ANDERSON, DAVID J., Rockefeller University  
 \*DAVIS, MIRIAM R., Princeton University  
 \*HURWITZ, JERARD, Albert Einstein College of Medicine  
 \*MEAROW, KAREN, McMaster University, Canada  
 \*NERBONNE, JEANNE M., California Institute of Technology  
 \*NOBLE, MARK D., University College London, England  
 \*RATNER, NANCY, Indiana University  
 \*SARABHAI, ANAND, Biocenter Laboratory, Ahmedabad, India  
 \*SMITH, SHARON W., Stanford University  
 \*WEHNER, JEANNE M., Dight Institute for Human Genetics  
 \*WILEY, RONALD G., Cornell Medical College  
 \*ZIGMOND, MICHAEL J., University of Pittsburgh

### PHYSIOLOGY

#### *Instructor-in-chief*

VAN HOLDE, KENSAL, Oregon State University

#### *Other faculty, staff, and lecturers*

ACKERS, GARY, Johns Hopkins University  
 ANGELES, LETICIA, University of Philippines System

ASTRIN, SUSAN, Institute for Cancer Research  
 BEGG, DAVID A., Harvard Medical School  
 BRENOWITZ, MICHAEL, Duke University Marine Laboratory  
 BROWN, JAY, University of Virginia  
 CHRISTOPHER, AL, Loyola University  
 COHEN, WILLIAM, Hunter College  
 DENTLER, BILL, University of Kansas  
 ELGIN, SARAH, C. R., Harvard University  
 ENGELHARD, V. H., Harvard University  
 GALVIN, PATRICK, University of Colorado, Denver  
 GOLDMAN, ROBERT, Carnegie-Mellon University  
 HAMKALO, BARBARA, University of California, Irvine  
 HEPLER, P. K., University of Massachusetts, Amherst  
 HOWE, CHRIS, Yale University  
 HUANG, RU-CHIH, Johns Hopkins University  
 HUTCHINSON, NANCY, University of California  
 HUXLEY, H. E., Cambridge, England  
 INOUÉ, SHINYA, Marine Biological Laboratory  
 KING, JONATHAN, Massachusetts Institute of Technology  
 MCCARTHY, BOB, Dartmouth College  
 MILLER, MOLLY, Swarthmore College  
 MOOSEKER, MARK, Yale University  
 POLLARD, H. B., National Institutes of Health  
 REEDER, RONALD H., Hutchinson Cancer Center  
 ROSA, MARGARET, Yale University  
 ROSENBAUM, JOEL, Yale University  
 SELICK, BARRY, University of Pennsylvania  
 STEPHENS, RAYMOND, Marine Biological Laboratory  
 SUMMERS, JESSE, Institute for Cancer Research  
 SZENT-GYORGYI, ANDREW, Brandeis University  
 VON HIPPEL, PETER, University of Oregon  
 WEBER, ANNE MARIE, University of Pennsylvania  
 WEINTRAUB, HAROLD, Hutchinson Cancer Center

### *Students<sup>1</sup>*

- \*AUSIO, JUAN C., Escuela Tecnica Superior, Barcelona, Spain
- BELL, JERRY A., Simmons College
- \*BLANCHARD, EDWARD, JR., University of Cincinnati
- BUAS, MICHAEL, National Cancer Institute
- BYNUM, ROBERT D., Dartmouth College
- \*DAVIS, LISA M., University of North Carolina
- DEATLY, ANNE, Rockefeller University
- \*DORFLINGER, LANETA, Yale University
- \*GREENBERG, SHARON, Cornell University
- \*HAMBLIN, MARTHA T., Oregon State University
- \*HEILMANN, LARRY, Wesleyan University
- HOWARD, ELIZABETH ANN, University of California, Berkeley
- JOHNSON, CARL HIRSCHIE, Stanford University
- \*KAZNOWSKI, CHRISTINE E., University of California, Irvine
- \*KELLY, CHARLES M., Case Western Reserve University
- \*KEW, DAVID, Wesleyan University
- LEWIS, LARRY, Millersville State College
- \*MAY, GREGORY, Yale University
- \*MERCER, ROBERT, Syracuse University
- \*MILLER, CAROL LYNN, University of Pennsylvania
- PANITZ, POLLY, Oberlin College

PATON, ARTHUR, University of Tennessee  
 RICHARDSON, MARGE, Iowa State University  
 RIGNEY, DAVID, Institute for Cancer Research  
 \*SMITH, DENICE, Dartmouth College  
 SUPRYNOWICZ, FRANK, University of California, Berkeley  
 TARTAKOFF, ALAN, University of Geneva, Switzerland  
 \*THOMPSON, JOHN, University of Massachusetts  
 \*VIERLING, ELIZABETH, University of Chicago  
 \*VINSON, CHARLES, University of Virginia  
 \*WALSH, JENNIFER, University of Montana  
 WANG, LEI-LEI, Baylor College of Medicine  
 WONG, YUK-CHOR, Harvard University  
 \*WOOD, PERIANN, Wesleyan University  
 \*YAGER, THOMAS, University of Denver

## NEURAL SYSTEMS AND BEHAVIOR

*Acting instructor-in-chief*

HOY, RONALD R., Cornell University

*Other faculty, staff, and lecturers*

BENNETT, MICHAEL, Albert Einstein College of Medicine  
 CAREW, T., Columbia University  
 CRANE, LINDA, Rockefeller University  
 EISNER, THOMAS, Cornell University  
 EVANS, CHARLES, Columbia University  
 FRASER, J., Brandeis University  
 GIBSON, DAN, Boston University  
 GOULD, J., Princeton University  
 HERTEL, HORST, Free University, Berlin  
 KALMIJN, ADRIANUS J., Woods Hole Oceanographic Institution  
 KONISHI, MAZAKAZU, California Institute of Technology  
 LEVINTHAL, CYRUS, Columbia University  
 MACAGNO, EDUARDO, Columbia University  
 MENZEL, RANDOLF, Free University, Berlin  
 MULLER, K., Carnegie Institute  
 NELSON, MARGARET, Harvard University  
 NICHOLLS, JOHN, Stanford University  
 NOTTEBOHM, FERNANDO, Rockefeller University  
 PALKA, JOHN, University of Washington  
 PEARSON, KEIR, University of Alberta, Canada  
 PRIOR, D., University of Kentucky  
 PURPURA, KEITH, Columbia University  
 REINGOLD, STEPHEN, Princeton University  
 SIMMONS, JAMES, Washington University  
 SUGA, NOBUO, Washington University  
 SUH, DICK Y., Columbia University  
 SUH, KYUNGSUN, Columbia University

*Students<sup>1</sup>*

\*BABLANIAN, GAYNE M., University of Rhode Island  
 \*BURKE, BRYANT, Yale University  
 \*COTRAN, PAUL, Harvard University  
 \*DEBSKI, ELIZABETH, University of Virginia  
 DERBY, CHARLES, Boston University

- \*FARLEY, JOSEPH, Princeton University  
 \*FLANAGAN, THOMAS R., Wesleyan University  
 FROST, WILLIAM, Princeton University  
 HARTZOG, GRADY, III, University of Florida  
 HOFFMANN, ROBERT, New York University  
 HOMBERG, UWE, Free University, Berlin  
 JURMAN, MARK, University of Pennsylvania  
 LAMOUR, YVON, National Institutes of Health  
 LEVITT, TAMI, Harvard School of Public Health  
 MORITA, ELAINE, Stanford University  
 PARIKII, JITENDRA, Physical Research Laboratory, Ahmedabad, India  
 PRESTI, DAVID, California Institute of Technology  
 \*SCHANER, PAMELA J., Pennsylvania State University  
 \*SCHNEIDER, JILL, Wesleyan University  
 \*STEWART, RANDALL R., Texas Tech University  
 TAKAHASHI, TERRY, SUNY Downstate Medical Center  
 \*TEAGUE, BARBARA, Arizona State University  
 WALTHALL, WALTER, Boston University

<sup>1</sup> All summer students listed completed the formal course programs. Asterisk indicates those completing post-course research sessions.

## JANUARY

### BEHAVIOR

#### *Instructor-in-chief*

ATEMA, JELLE, Boston University/Marine Biological Laboratory

#### *Other faculty, staff, and lecturers*

ALKON, DANIEL, National Institutes of Health/Marine Biological Laboratory  
 ASHKENAS, LINDA, Boston University  
 BARLOW, ROBERT, Syracuse University  
 BERG, CARL J., JR., Harvard University/Marine Biological Laboratory  
 BOWLES, FRANCIS, Marine Biological Laboratory  
 BRISBIN, I. LEHR, Savannah River Ecology Program  
 CAPRANICA, ROBERT, Cornell University  
 CAREY, FRANCIS, Woods Hole Oceanographic Institution  
 CROW, TERRY, National Institutes of Health/Marine Biological Laboratory  
 DETHIER, VINCENT, University of Massachusetts  
 DOUGLAS, MATTHEW, Boston University  
 ELGIN, RANDALL, Boston University  
 GOODENOUGH, JUDITH, University of Massachusetts  
 GRIFFIN, DONALD, Rockefeller University  
 HARRINGTON, JONATHAN, SUNY at Stony Brook  
 KALMIJN, ADRIANUS J., Woods Hole Oceanographic Institution  
 KANWISHER, JOHN, Woods Hole Oceanographic Institution  
 KARNOFSKY, ELISA, Marine Biological Laboratory  
 KREITHEN, MEL, Cornell University  
 LEVINE, JOSEPH, Harvard University  
 MICHEL, CELIA, Newton, Massachusetts  
 MICHEL, GEORGE, Newton, Massachusetts  
 MULLER-SCHWARZE, Dietland, SUNY at Syracuse  
 NELSON, MARGARET, Harvard Medical School  
 PAYNE, KATY, Woods Hole, Massachusetts  
 SMITH, DOUG, SUNY at Stony Brook  
 STENZLER, DAN, Setauket, New York

STUART, ALASTAIR, University of Massachusetts  
 SULZMAN, FRANK, Harvard Medical School  
 SWAIN, TONY, Boston University  
 WATKINS, BILL, Woods Hole Oceanographic Institution  
 WILLIAMS, JANET, Swarthmore College  
 WILLIAMS, TIMOTHY, Swarthmore College

*Students*

BAGBY, BRENDA, Oberlin College  
 BROYLES, JUDY, University of Texas, Arlington  
 BRY, JOHN, Tufts University  
 COWPERTHWAITTE, Leslie, Massachusetts Audubon  
 DAVIS, ROBERT, Bennington College  
 DEVINE, DANA, Boston University  
 DONALDSON, TERRY, University of Guam  
 EDDS, PEGGY, University of Maryland  
 EPPI, RENE, SUNY at Stony Brook  
 FREDERICK, PETER, Hockessin, Delaware  
 GIBBONS, SHELLEY, Tufts University  
 GOEBEL, ANNA, Abilene Christian University  
 JESWINE, NAINA, University of Kansas  
 KENDALL, SCOTT, University of Iowa  
 KUZMA, GREGORY, University of California, Riverside  
 MCCORMICK, FRANK, St. Louis University  
 MCFARREN, MARTHA, University of Vermont  
 NONACS, PETER, University of Kentucky  
 OWEN, RALPH, University of Massachusetts  
 REILLY, PAMELA, College of St. Catherine  
 RITTENHOUSE, ANN, Boston University  
 SPEARS, JONATHON, University of Delaware  
 TROTT, THOMAS, Boston University

COMPARATIVE PATHOLOGY OF MARINE INVERTEBRATES

*Instructor-in-chief*

BANG, FREDERIK B., Johns Hopkins University

*Other faculty, staff, and lecturers*

BANG, BETSY G., Johns Hopkins University  
 COOPER-WILLIS, ANN, Johns Hopkins University  
 EDDS, KENNETH, Marine Biological Laboratory  
 FARLEY, C. AUSTIN, NOAA Marine Fisheries Laboratory  
 JOHNSON, PHYLLIS, NOAA Marine Fisheries Laboratory  
 PEARCE, JACK, NOAA Marine Fisheries Laboratory  
 MICHELSON, E., Harvard School of Public Health  
 PRENDERGAST, ROBERT, Johns Hopkins University  
 REINISCH, CAROL, Harvard University  
 RICKLES, FRED, University of Connecticut Health Center

*Students*

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#### DEVELOPMENTAL BIOLOGY

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 CROWLEY, PAULA, Skidmore College  
 DEPELTEAU, AUDREY, Rensselaer Polytechnic Institute  
 DUBE, FRANCOIS, University of Montreal, Canada  
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 PAGE, JENNIFER, Tulane University  
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## ECOLOGY

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#### BIOLOGICAL ELECTRON MICROSCOPY FOR TECHNICIANS

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COMPARATIVE LIGHT AND ELECTRON MICROSCOPY IN CLINICAL DIAGNOSIS

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 HOY, RONALD R., Cornell University  
 MAKOWSKI, LEE, Brandeis University  
 MESSNER, KENNETH H., Milton S. Hershey Medical Center  
 ORTABASI, ILSE, Center for Energy & Environment Research  
 SQUIBB, KATHERINE, National Institute of Environmental Health Sciences

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 BLOGOSLAWSKI, WALTER J., National Marine Fisheries Service  
 BRYANT, BRUCE, Boston University/Marine Biological Laboratory  
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 DOYLE, ROGER W., Dalhousie University, Canada  
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 GRASSLE, JUDITH, Marine Biological Laboratory  
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 HANLON, ROGER T., University of Texas, Galveston  
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 STEVENS, DAVE, AMERON  
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 ROMMEL, FREDERICK, Plum Island Animal Disease Center  
 VEKENS, LORRAINE, New England Nuclear Corp.  
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 ROBERTS, DOUGLAS, Pacific Optical Specialists  
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## QUANTITATIVE ANALYSIS OF ELECTRON MICROGRAPHS

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## X. RESEARCH AND TRAINING PROGRAMS

### SUMMER

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EDDS, KENNETH, Marine Biological Laboratory

##### *Staff*

JARVIS, NORMAN, Marine Biological Laboratory

#### LABORATORY OF JUDITH P. GRASSLE

##### *Director*

GRASSLE, JUDITH P., Marine Biological Laboratory

##### *Staff*

BIRTWISTLE, FERN, Marine Biological Laboratory  
 PHILBIN-MUNSON, MAYBELLINE, Marine Biological Laboratory  
 SMITH, JENNIFER, Marine Biological Laboratory

#### LABORATORY OF SHINYA INOUÉ

##### *Director*

INOUE, SHINYA, University of Pennsylvania/Marine Biological Laboratory

*Staff*

EISEN, ANDREW, University of Pennsylvania  
FEINBERG, MARK, University of Pennsylvania

## LABORATORY OF ERIC KANDEL

*Director*

KANDEL, ERIC, Columbia University

*Staff*

BERG, CARL J., JR., Columbia University/Harvard University  
CAPO, THOMAS, Columbia University  
PAIGE, JOHN, Columbia University/Cornell University  
PERRITT, SUSAN, Columbia University  
RUBINOW, JERRY, Marine Biological Laboratory

## LABORATORY OF KEITH R. PORTER

*Director*

PORTER, KEITH R., University of Colorado

*Staff*

BECKERLE, MARY C., University of Colorado  
BYERS, H. RANDOLPH, Harvard Medical School  
GONCALVES, MARK A., University of Colorado  
MCNIVEN, MARK, Marine Biological Laboratory

## LABORATORY OF ROBERT V. RICE

*Director*

RICE, ROBERT V., Carnegie-Mellon University

*Staff*

HOUGHTON, SUSAN, Carnegie-Mellon University  
LASH, REBECCA, Carnegie-Mellon University  
ROSLANSKY, PRISCILLA, Carnegie-Mellon University

## LABORATORY OF RAYMOND E. STEPHE

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STEPHENS, RAYMOND E., Marine Biological Laboratory

*Staff*

OTTER, TIMOTHY, University of North Carolina  
PORTER, MARY E., University of Pennsylvania  
PRATT, MELANIE, Marine Biological Laboratory  
STOMMEL, ELIJAH, Marine Biological Laboratory  
SUPRENANT, KATHY, University of Virginia

## LABORATORY OF LEWIS G. TILNEY

*Director*

TILNEY, LEWIS G., University of Pennsylvania

*Staff*

JAFFE, LAURINDA A., University of Pennsylvania

## LABORATORY OF RUTH D. TURNER

*Director*

TURNER, RUTH D., Harvard University

*Staff*

BERG, CARL J., JR., Columbia University/Harvard University

TRACEY, GREGORY A., Harvard University

## XI. HONORS

## FRIDAY EVENING LECTURES

VINCENT DETHIER, University of Massachusetts, January 5

*"Chemical Ecology, Insect Feeding"*

ROBERT CAPRANICA, Cornell University, January 12

*"Frog Communication"*

KATY PAYNE, Woods Hole, Massachusetts January 19

*"The Changing Songs of Humpback Whales"*

EDWARD O. WILSON, Harvard University, June 26

*"The Organization of Insect Societies"*

RICHARD O. HYNES, Massachusetts Institute of Technology, July 6

The Edgar Zwilling Lecture, *"The Role of Surface Protein in Cell Behavior"*

STEPHEN W. KUFFLER, Harvard University, July 12, 13

Forbes Lectures, 1. *"Different Modes of Synaptic Signaling"*. 2. *"Slow Synaptic Events and the Search for a New Transmitter"*

EDWIN H. SOUTHERN, University of Edinburgh, Scotland, U. K., July 20

*"DNA and Evolution"*

HAROLD L. ATWOOD, University of Toronto, July 27

Fred Lang Memorial Lecture, *"Claw Control in Crustaceans"*

IAN CHESTER-JONES, University of Sheffield, England, U. K., August 3

*"Hormonal Influences on Ionic Balance in Selected Vertebrates"*

LEWIS THOMAS, Sloan-Kettering Memorial Institute, August 10

*"The Sense of Self in Biology"*

STANLEY COHEN, Stanford University, August 24

*"Gene Manipulation in Microorganisms"*

## GRASS FOUNDATION FELLOWS

AUGUSTINE, GEORGE, University of Maryland

BENSON, JACK A., Laboratory of Sensory Sciences

CARBONETTO, SALVATORE, Carnegie Institute of Washington

DUBINSKY, JANET, University of North Carolina

FRASER, SCOTT E., Johns Hopkins University

GOLD, GEOFFREY H., University of California at San Francisco

IADAROLA, MICHAEL J., Georgetown University  
 MARGIOTTA, JOSEPH F., SUNY at Stony Brook  
 MASUKAWA, LEONA M., Armed Forces Radiobiology Research Institute  
 POLLACK, GERALD S., Cornell University  
 REUBEN, JOHN, Columbia University, co-director  
 REINGOLD STEPHEN C., Princeton University  
 WATSON, WINSOR, III, University of New Hampshire, co-director

#### JOSIAH MACY, JR., FOUNDATION FELLOWS AND SCHOLARS

ADAMS, JAMES A., Tennessee State University  
 BROWN, RATHER G., Alabama A&M University  
 DAWKINS, BEVERLY ANN, Atlanta University  
 GRAY, PAULETTE S., Atlanta University  
 HICKS, HERALINE E., Atlanta University  
 HOGAN, JAMES C., JR., University of Connecticut  
 JONES, BETTY RUTH, Morehouse College  
 JORDAN, THOMAS L., Dillard University  
 SHELTON, MARK R., Colorado State University  
 WALKER, DOROTHY G., Howard University

#### STEPS TOWARD INDEPENDENCE FELLOWS

BOURNE, GEORGE B., University of Calgary, Canada  
 CATAPANE, EDWARD J., CUNY, Medgar Evers College  
 FARLEY, JOSEPH, Princeton University  
 HAYHOME, BARBARA, University of Nebraska  
 HUFNAGEL, LINDA, University of Rhode Island  
 KUSERK, FRANK T., Moravian College  
 LOCKWOOD, ARTHUR H., University of North Carolina  
 MAGLOTT, DONNA R., Howard University  
 SAFFO, MARY BETH, Swarthmore College  
 TREISTMAN, STEVEN N., Bryn Mawr College  
 WEST, DAVID L., Sangamon State University

#### LILLIE FELLOW

SOUTHERN, E. M., University of Edinburgh, Scotland, U.K.

#### SOCIETY OF GENERAL PHYSIOLOGISTS SCHOLARS

HOROVITCH, SHARON, Massachusetts Institute of Technology  
 HOWARD, ELIZABETH ANN, University of California, Berkeley  
 VIERLING, ELIZABETH, University of Chicago

## XII. INSTITUTIONS REPRESENTED

### U. S. A.

Abilene Christian University	Antioch, New England
Alabama A&M University	Arizona, University of
Albert Einstein College of Medicine	Arizona State University
American Museum of Natural History	Armed Forces Radiobiology Research Institution
AMERON	Assumption College
Ames Laboratory, Moffett Field	Atlanta University
Amherst College	AZI Corporation

- J. T. Baker Chemical Co.  
 Barnard College  
 Battelle Memorial Institute  
 Baylor College of Medicine  
 Benedictine College  
 Bennington College  
 Beth Israel Hospital  
 Bigelow Laboratory for Ocean Sciences  
 Birmingham Southern College  
 Boone County Hospital  
 Boston Cancer Institute  
 Boston College  
 Boston University  
 Boston University Marine Program  
 Boston University School of Medicine  
 Bowman Gray School of Medicine  
 Brandeis University  
 Bridgeport, University of  
 Brookhaven National Laboratory  
 Brown University  
 Bryn Mawr College  
 Bucknell University
- California Institute of Technology  
 California, University of, Berkeley  
 California, University of, Davis  
 California, University of, Irvine  
 California, University of, Los Angeles  
 California, University of, Medical School  
 California, University of, Riverside  
 California, University of, San Diego  
 California, University of, Santa Barbara  
 California, University of, Santa Cruz  
 California State University, Long Beach  
 Cancer Research Institute  
 Cape Cod Hospital  
 Cape Cod Planning & Economic Development  
 Commission  
 Carl Zeiss Inc.  
 Carnegie Institution of Washington  
 Carnegie-Mellon University  
 Case Western Reserve University  
 Center for Energy & Environmental Research  
 Chicago, University of  
 Chicago Medical School  
 Cincinnati, University of  
 Clark College  
 Clark University  
 Clemson University  
 Colorado, University of  
 Colorado, University of, Medical School  
 Colorado State University  
 Columbia University  
 Columbia University, College of Physicians  
 & Surgeons  
 Columbia University, School of Dentistry  
 Connecticut, University of  
 Connecticut, University of, Health Center  
 Connecticut, University of, Medical School  
 Cook College  
 Cornell Medical College  
 Cornell University
- Cornell University, Medical Center  
 Cryobiology Laboratory
- Dartmouth College  
 Delaware, University of  
 Denver, University of  
 De Pauw University  
 Dight Institute for Human Genetics  
 Dillard University  
 Drew University  
 Duke University  
 Duke University, Medical Center
- East Carolina University  
 Eastern Virginia Medical School  
 Eastman Kodak Co.  
 ECO Research Inc.  
 Ecosystems Laboratory  
 Eisenhower College  
 Emory University  
 Environmental Research Laboratory  
 ETEC Corp.  
 Ethicon Research Foundation
- Florida, University of  
 Florida State University  
 Frederick Cancer Research Center
- General Electric Corporate Research & De-  
 velopment  
 Georgetown University  
 Georgia, University of  
 Georgia, Medical College of  
 Good Samaritan Hospital & Medical Center  
 W. L. Gorg Associates  
 Goucher College
- Hahnemann Medical College  
 Hamamatsu Systems, Inc.  
 Hamilton College  
 Hampshire College  
 Harbor Branch Foundation  
 Harvard Medical School  
 Harvard School of Public Health  
 Harvard University  
 Hawaii, University of, Kewalo Marine Labo-  
 ratory  
 Hawaii, University of, School of Medicine  
 Hofstra University  
 Holy Cross College  
 Hopkins Marine Center  
 Houston, University of  
 Howard University  
 Howard University, College of Medicine  
 Humboldt State University  
 Hutchinson Cancer Center
- Illinois, University of  
 Illinois, University of, College of Medicine  
 Illinois Institute of Technology  
 Indiana University  
 Indiana University, School of Medicine



- Institute for Cancer Research, The  
 Iowa, University of  
 Iowa, University of, Hospitals & Clinics  
 Iowa State University
- JEOL-USA, Inc.  
 John B. Pierce Foundation Laboratory  
 Johns Hopkins University, The  
 Johns Hopkins University, The School of  
   Hygiene  
 Johns Hopkins University, The School of  
   Medicine
- Kansas, University of  
 Kentucky, University of  
 Kresge Eye Institute
- Laboratory of Biophysics, NINCDS-NIH  
 Laboratory for Comparative Biochemistry  
 Laboratory Procedures Northwest  
 Laboratory of Sensory Sciences, Honolulu  
 Lafayette College  
 Lederle Laboratory  
 Lehigh University  
 E. Leitz, Inc.  
 LKB Instruments, Inc.  
 Louisiana State University  
 Louisville, University of  
 Loyola College  
 Luther College
- Macalester College  
 Manhattan College  
 Marine Biological Laboratory  
 Marthas Vineyard Shellfish Group  
 Maryland, University of  
 Maryland, University of, School of Medicine  
 Massachusetts, University of, Amherst  
 Massachusetts, University of, Boston  
 Massachusetts Audubon  
 Massachusetts Eye & Ear Infirmary  
 Massachusetts General Hospital  
 Massachusetts Institute of Technology  
 Massachusetts State Lobster Hatchery  
 Merck, Sharp, & Dohme Research Laboratories  
 Mercy College  
 Merrell Research Center  
 Miami, University of  
 Miami, University of, School of Medicine  
 Michigan, University of  
 Michigan State University  
 Middlebury College  
 Millersville State College  
 Milton S. Hershey Medical Center  
 Minnesota, University of  
 Minnesota, University of, Medical School  
 Minnesota Department of Health  
 Miriam Hospital, The  
 Mississippi, University of  
 Monmouth College  
 Montana, University of
- Montefiore Hospital  
 Morehouse College  
 Moravian College  
 Mount Holyoke College  
 Mount St. Vincent, College of  
 Muir College  
 Murray State University
- National Animal Disease Center  
 NASA, Washington  
 National Bureau of Standards  
 National Cancer Institution  
 National Institute of Environmental Health  
   Sciences  
 National Institute of Mental Health/NIH  
 National Institute of Health  
 National Marine Fisheries Service/NOAA  
 Naval Dental Research Institute  
 Naval Regional Medical Center  
 Naval Submarine Medical Research Labora-  
   tory  
 Nebraska, University of  
 New England Nuclear Corporation  
 New Hampshire, University of  
 New York, City University of, Brooklyn  
   College  
 New York, City University of, City College  
 New York, City University of, Herbert Lehman  
   College  
 New York, City University of, Hunter College  
 New York, City University of, Medgar Evers  
   College  
 New York, State University of, Binghamton  
 New York, State University of, Buffalo  
 New York, State University of, Downstate  
   Medical Center  
 New York, State University of, Oneonta  
 New York, State University of, Stony Brook  
 New York, State University of, Syracuse  
 New York, State University of, Upstate  
   Medical Center  
 New York University  
 New York University Medical Center  
 New York University School of Medicine  
 Nikon, Inc.  
 North Carolina, University of, Chapel Hill  
 North Carolina, University of, Raleigh  
 North Carolina, University of, School of  
   Medicine  
 North Carolina State University  
 Northeastern Illinois University  
 Northport Veterans Administration Medical  
   Center  
 Northwestern University  
 Northwestern University, Medical School  
 Notra Dame, University of
- Oak Ridge National Laboratory  
 Oakland University  
 Oberlin College  
 Oklahoma State University

- Olympus Corporation of America  
 Opti-Quip, Inc.  
 Oregon, University of  
 Oregon State University  
 Our Lady of the Lourdes Hospital
- Pacific, University of  
 Pacific Optical Specialists  
 Pennsylvania, University of  
 Pennsylvania, University of, School of Medicine  
 Pennsylvania Medical College  
 Pennsylvania State University  
 Pergamon Press  
 Perkin-Elmer Corporation  
 Pittsburgh, University of  
 Plum Island Animal Disease Center  
 Polaroid Corporation  
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 Princeton University  
 Proctor Community Hospital  
 Public Health Research Institute  
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- Rensselaer Polytechnic Institute  
 Rhode Island, University of  
 Rhode Island Hospital  
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 Rochester, University of  
 Rockefeller Foundation  
 Rockefeller University, The  
 Roswell Park Memorial Institute  
 Rush Medical College  
 Rush University  
 Rutgers College  
 Rutgers—The State University of New Jersey  
 Rutgers University Medical School
- St. Andrews University  
 St. Barabas Medical Center  
 St. Catherine, College of  
 St. Elizabeth, College of  
 St. Joseph Medical Center  
 St. Louis University  
 St. Rose, College of  
 St. Vincent's Hospital  
 Sangamon State University  
 Santa Fe, College of  
 Savannah River Ecology Program  
 Scheie Eye Institute  
 Scripps Institute of Oceanography  
 Seton Hill College  
 Sherbrooke, University of  
 Sidney Farber Cancer Institute  
 Simmons College  
 Sloan-Kettering Institute  
 Smith College  
 Smithsonian Institution  
 South Florida, University of  
 Southern Illinois University  
 Southwest Texas State University  
 Stanford University
- State of New York, Department of Health  
 Stauffer Chemical Co.  
 Stephens College  
 Strang Clinic  
 Suffolk University  
 Swarthmore College  
 Sweetbriar College  
 Swift Instruments, Inc.  
 Syracuse University  
 Syracuse University, Institute for Sensory Research
- Temple University Medical School  
 Tennessee, University of  
 Tennessee State University  
 Texas, University of, Arlington  
 Texas, University of, Austin  
 Texas, University of, Galveston  
 Texas, University of, Medical Branch  
 Texas, University of, Southwestern Medical School  
 Texas Christian University  
 Texas Technical University  
 Toledo Path, Inc.  
 Tousimis Research Corporation  
 Trinity College  
 Tufts University  
 Tulane Medical Center  
 Tulane University
- Union University, Albany Medical College of  
 United States Department of Agriculture  
 United States Geological Survey  
 Utah, University of
- Vanderbilt University  
 Vanderbilt University, School of Medicine  
 Venus Scientific, Inc.  
 Vermont, University of  
 Veterans Administration Hospital, Brooklyn  
 Veterans Administration Medical Center of Boston  
 Veterans Administration Medical & Regional Office Center  
 Virginia, University of  
 Virginia Polytechnic Institute
- Washington, University of  
 Washington College  
 Washington University  
 Washington University, School of Dentistry  
 Washington University, School of Medicine  
 Wayne State University  
 Wayne State University, School of Medicine  
 Wellesley College  
 Wesleyan University  
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 Williams College  
 Wisconsin, University of  
 Wistar Institute  
 Wistar Institute for Anatomy & Biology  
 Woods Hole Oceanographic Institution  
 Wooster College

Worcester Foundation for Experimental  
Biology  
Worcester Polytechnic Institute  
WPVI-TV

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Yale University, School of Medicine  
Yale University, School of Forestry & Environmental Studies

FOREIGN

Alberta, University of, Canada  
Amsterdam, University of, Netherlands  
Arecibo Laboratories, Puerto Rico  
Athens, University of, Medical School, Greece  
Basel, The University of, Biocenter, Switzerland  
Biocenter Laboratory, Ahmedabad, India  
British Columbia, University of, Canada  
Calgary, University of, Canada  
Cambridge, University of, England, U. K.  
Caribbean Marine Biological Institute,  
Netherlands  
Centro de Biofisica y Bioquimica, Caracas,  
Venezuela  
Centre for Overseas Pest Research, Kensington,  
London, England, U. K.  
City University, London, England, U. K.  
Colegio Universitario, Alicante, Spain  
Dalhousie University, Canada  
Edinburgh, University of, Scotland, U. K.  
Escuela Tecnica Superior de Ingenieros Industriales de Barcelona, Spain  
Freien Universität, Institut für Tierphysiologie,  
Berlin, West Germany  
Friedrich Miescher-Institut, Switzerland  
Gran Mariscalde Ayacucho, Venezuela  
Grenoble, University of, France  
Guam, University of  
Hebrew University, The, of Jerusalem, Israel  
Ibadan, University of, Nigeria  
Imperial College of Science & Technology,  
London, England, U. K.  
Institut Pasteur, Paris, France  
Instituto de Biologia del Desarrollo  
Instituto Venezolano de Investigaciones,  
Venezuela

Kings College, London, England, U. K.  
Laval, University of, Canada  
Leeds, University of, England, U. K.  
Manitoba, University of, Canada  
McGill University, Canada  
McMaster University, Canada  
Medical Research Council, England, U. K.  
Memorial University of Newfoundland, Canada  
Nagoya University, Japan  
North Wales, University of, Wales, U. K.  
Ottawa, University of Canada  
Philippines, University of  
Philippines, University of, College of Medicine  
Physical Research Laboratory, India  
Queen Mary College, University of London,  
England, U. K.  
Queens University, Canada  
Saint Andrews University, Gatty Marine Laboratory, Scotland, U. K.  
Scarborough College, Canada  
Sheffield, University of, England, U. K.  
Southampton General Hospital, England, U. K.  
Southampton, University of, England, U. K.  
Stazione Zoologica di Napoli, Italy  
Sussex University, England, U. K.  
Tel-Aviv University, Israel  
Tokyo Medical & Dental University, Japan  
Toronto, University of, Canada  
Universidad Nacional de Tucuman, Argentina  
University College, London, England, U. K.  
Venezuelan Institute for Scientific Research  
Waterloo, University of, Canada  
Western Ontario, University of, Canada

XIII. LABORATORY SUPPORT STAFF

Including Persons Who Joined or Left the Staff During 1979

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SMITH, HOMER P., General Manager

ADMINISTRATION

*Controller's Office*

CASEY, EDWARD G., Controller  
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ELLIS, NANCY L.

HOBBS, ROGER W., JR.  
HOWARD, JOAN E.  
SEMINO, SUZANNE J.

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MASER, MORTON D, Assistant Director for Educational and Research Services  
LEIGHTON, JANE L. SAWDO, PAMELA V.

*General Manager's Office*

SMITH, HOMER P., General Manager  
BUTZ, FLORENCE S. JOHNSON, FRANCES N.  
GEGGATT, AGNES L.

*Public Relations Office*

MAHER, ANNE CAMILLE, Public Relations Officer  
WYE, DENICE J.

*Biological Bulletin*

METZ, CHARLES B., Managing Editor  
RUSSELL-HUNTER, W. D., Managing Editor  
MORSE, LAURIE; SCHWARTZ, SUSAN

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BOURGOIN, LEE E.	LOVERING, RICHARD A.
BRODERICK, MADELINE H.	LUNN, ALAN G.
DONOHUE, JOSEPH E.	MACLEOD, JOHN B.
ENOS, GLENN R.	MAURER, JOHN E.
FUGLISTER, CHARLES K.	MILLS, STEPHEN A.
GEGGATT, RICHARD E., JR.	MOORE, MORGAN
GIBBONS, ROBERTO G.	ST. JEAN, SIMONE
GONSALVES, WALTER W., JR.	SEARS, CLAYTON
HOBBS, ROGER W., JR.	SMART, MERILYN A.
KLEINDINST, THOMAS N.	THRASHER, FREDERICK
KUIL, ELISABETH	WARD, FREDERICK
LEHY, DONALD B.	WHITTAKER, WILLIAM
LEWIS, RALPH H.	

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TIFFNEY, WESLEY N., Curator	
BUSH, LOUISE F.	MOUL, EDWIN T.
MONTIERO, EVA S.	WIER, SUSAN J.

## LIBRARY

FESSENDEN, JANE, Librarian	
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BAILY, REBECCA J.	KARALEKAS, HOLLY E.
FITZGERALD, DAVID J.	SWAIN, LAUREL
FRANK, CHARLOTTE F.	WEST, G. ALEXANDER
GRICE, JOAN H.	WHITE, M. ANN
IRVING, LYNNE A.	

## MARINE RESOURCES

VALOIS, JOHN J., Manager  
 ENOS, EDWARD G., JR.  
 ENOS, JOYCE  
 HEBDEN, ROBERT M.  
 LANE, HOWARD A.

LAWDAY, LEWIS M.  
 TASSINARI, EUGENE  
 TRAPASSO, BRUNO  
 VARAO, JOIIN

## RESEARCH SERVICES

MASER, MORTON D, Assistant Director for Educational and Research Services  
 ANDRADE, JULIE A.  
 ANTHONY, THOMAS R.  
 BARNES, FRANKLIN D.  
 BARNES, JOHN S.  
 CARRINGTON, CATHY A.  
 EBERHARD, CAROL A.

GOLDER, LINDA M.  
 GOLDER, ROBERT J.  
 MARTIN, LOWELL V.  
 SILVA, MARK  
 SYLVIA, FRANK E.

## SUMMER SUPPORT STAFF EMPLOYEES

ASHLEY, MARY  
 ASHMORE, JILL  
 BARTH, MICHAEL  
 BELLINGHAM, JAY  
 BRODEUR, JANET  
 BURNETT, LYNN  
 CARRUTH, SHARON  
 CORNELL-BELL, ANN  
 FEDDE, ELEANOR  
 GALVIN, REBECCA  
 HALEY, BETH  
 HANSEN, ERIC  
 HANSON, LISA  
 IRISH, BRADFORD  
 KUKI, ATSUO  
 LUNN, JEFFREY  
 MAINWARING, DANA  
 MARTIN, DANIEL  
 MASER, JILL  
 MASLAND, MARY

McKINNON, JANE  
 MILDVAN, HEATHER  
 MOORE, S. THOMSON  
 NORDGREN, MARCIA  
 OFFENBACH, NANCY  
 PARKER, TIMOTHY  
 PARPART, LAURA  
 PETERSON, PHILIP  
 PHILLIPS, CARL, JR.  
 RYAN, DANIEL  
 SULLIVAN, GAIL  
 TRAVIS, MARK  
 UPTON, EDWARD  
 VALOIS, FRANCIS  
 WALKER, ALLEN  
 WEISS, NOAH  
 WEST, HILLARY  
 WETZEL, ERNEST  
 WHITTAKER, WILLIAM A.  
 YOUNG, SARA